REGIONAL POPULATION PROJECTIONS FOR NEWFOUNDLAND AND LABRADOR 2016-2036

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REPORT PREPARED FOR THE LESLIE HARRIS CENTRE OF REGIONAL POLICY AND DEVELOPMENT, MEMORIAL UNIVERSITY
POPULATION PROJECT: *NEWFOUNDLAND AND LABRADOR IN TRANSITION*

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The Population Project: Newfoundland and Labrador in Transition

The population of Newfoundland and Labrador is rapidly aging, which when combined with high rates of youth out-migration, declining birth rates, and an increasing number of people moving from rural parts of the province to more urban centres, means that the province is facing an unprecedented population challenge. Without intervention, this trend will have a drastic impact on the economy, governance, and the overall quality of life for the people of the province. Planning for this change and developing strategies to adjust and adapt to it is paramount.

The Harris Centre's Population Project has developed potential demographic scenarios for the province and its regions for the next 20 years as a basis for exploring a number of the issues arising. These include, but are not limited to, those concerning:

- **Labour markets** – how will future demands for labour be met given a shrinking labour supply?
- **Service demands** – what are the implications of an aging and a geographically shifting population on the demand for public, private and non-government sector services?
- **Service provision** – what are the implications of a declining rural population for the costs and delivery of services to an increasingly smaller and older, but still geographically dispersed population?
- **Governance** – how will local and senior levels of government respond to changing governance issues in the light of these demographic changes and challenges?

Utilizing expertise from both inside and outside the university, the project employs a combined research and debate approach to inform and contribute to government policy, as well as to develop strategies for the private and non-profit sectors to respond to the broad range of issues resulting from the anticipated population shift.

This report, By RAnLab, Memorial University, presents a series of population projections for Newfoundland and Labrador for the period 2016-2036 and is a companion piece to an earlier report that presented population projections for Labrador. These reports set the stage for further analysis of the policy implications that demographic change in the Province will have for its people, its economy and its governance. All reports generated through the Population Project will be made available online at www.mun.ca/harriscentre/populationproject, while more information about the project can be obtained by contacting the Project Director. Comments on the Project and reports generated are welcomed.

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EXECUTIVE SUMMARY

In 2015, Newfoundland and Labrador had the most rapidly aging population in the country – which when combined with high rates of youth out-migration, declining birth rates, and an increasing number of people moving from rural parts of the province to more urban centres, means that the province is facing an unprecedented population challenge. Without intervention, this trend will have a drastic impact on the economy, governance, and overall quality of life for the people of the province. The need to plan for these changes and develop strategies to adjust and adapt to the changes is paramount.

This report focuses specifically on the regions in Newfoundland and Labrador (see Figure 1) for the period 2016-2036, but includes estimates for the Province as a whole. These projections provide a basis for further research into the implications of demographic change in the province. Results from three projection models are presented. These models are:

- The **Natural Survival Model (NS)** where population change is dependent on recently observed age specific births and deaths only and migration is not included.
- The **Historical (Cyclic) Survival Model (HS),** which assumes recent age specific birth and death rates continue, as in the NS model, but includes migration rates as experienced during the last 10-15 years. Two scenarios for this model are offered based on different migration trend assumptions.
- The **Replacement Survival Model** (RS), which estimates the number of net in-migrants required to maintain the current workforce population for each region, given historical trends of births, deaths and in/out migration. Three scenarios are offered based on different replacement success factors.

The Natural (NS), Historical (HS) and Replacement Survival (RS) models provide insight to how population will change in terms of both the total number of people living in a region as well as the resulting age structure if the assumptions of the models hold true. The NS model indicates the capacity of a region to grow by natural replacement by accounting for regional fertility and death rates, but without a migration factor in the equation. More importantly, this model identifies regions whose age structure combined with its fertility and death rates can or cannot maintain their populations without in-migration.

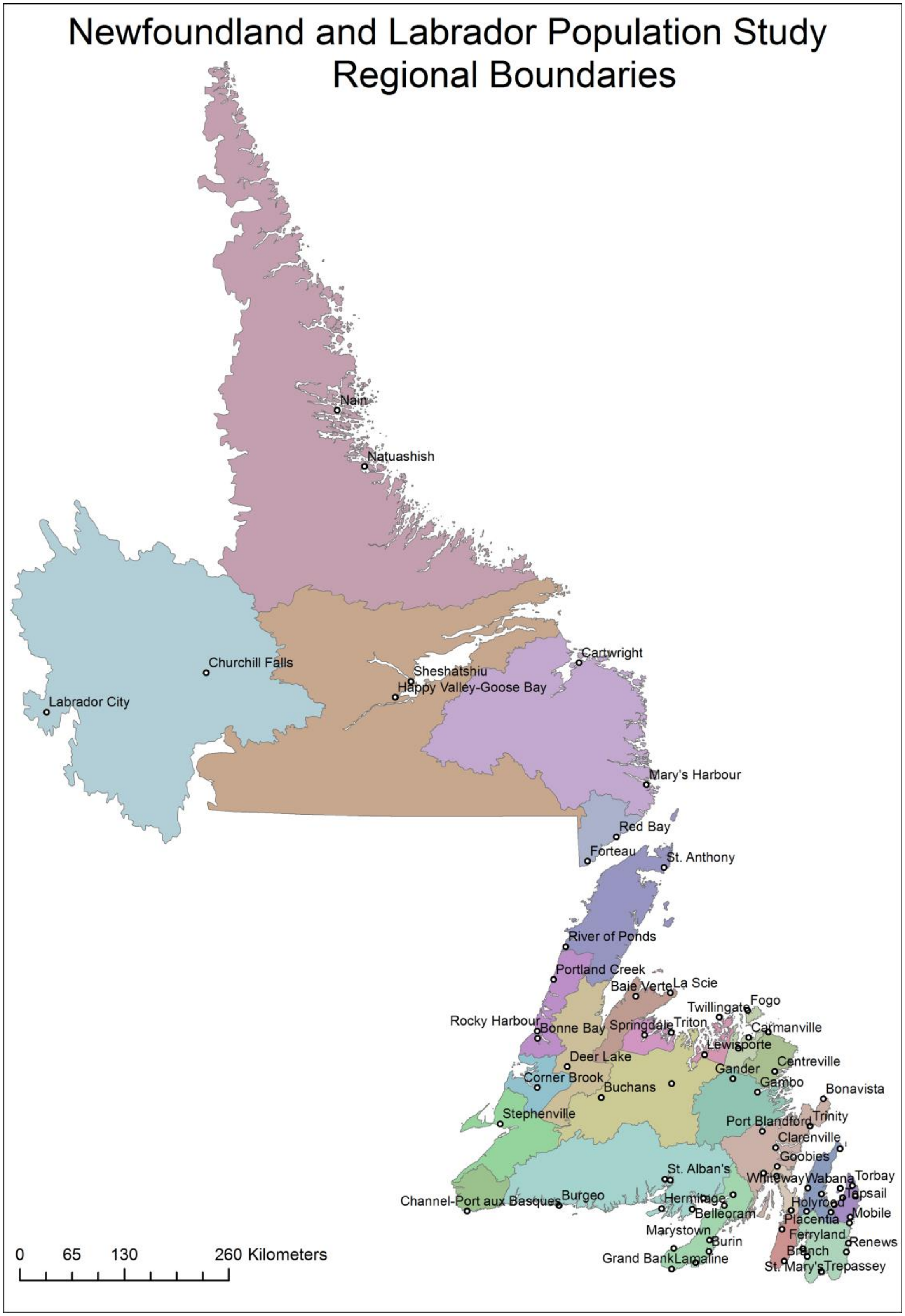


Figure 1: **Newfoundland and Labrador Study Regions**

The HS model results provide insight into the age structure of populations if past migration trends continue into the future. For some regions this may be likely, given that over multiple census periods there has been very little, if any, in-migration and significant out-migration of younger cohorts without replacement. The result, a decreasing and rapidly aging population, is particularly significant in those regions that will decline even where a significant labour force replacement factor is built in as indicated in the results from the RS model.

Workforce replacement requires that those not previously in the workforce join it, that others remain in the region rather than leave, and/or there is in-migration. Given the economic base of many of the Island's regions, the required replacement success levels necessary to maintain the workforce population, as forecast in the RS model scenarios, will be difficult to achieve. The overall conclusion is that the aging trend in the province as a whole suggests that there are underlying fertility and migration issues that will prevent maintaining or growing the base population in the long term.

For the province as a whole the NS model indicates that deaths would exceed births over the projection period and, excluding migration, there is little or no internal propensity for growth. When migration trends are factored in the HS model outcomes are similar to those from the NS model - the overall population is projected to decline by nearly 8% between 2016 and 2036 under the medium scenario. Even a replacement of 70% of the current labour force would not be sufficient to maintain the current overall workforce population to 2036. The pattern of low birth rates, high out-migration, an aging population and overall population decrease is common to all regions in the province with the exceptions of the North East Avalon and Central Labrador.

For the North East Avalon the NS model suggests that there would be decline in the population of 4% over the 2016-2036 timeframe. However, assuming current and recent past migration patterns, the HS model suggests that these losses would be offset by in-migration and there is a predicted overall increase in population of more than 15.3% in the 2016-2036 period under the medium scenario. These projections do not consider other factors such as availability and prices of land and housing and infrastructure issues and so whether this rate of growth can be sustained over the projection period may be debatable. Nevertheless this is the only region on the Island expected to show significant growth in the projection timeframe.

In Central Labrador the population is expected to remain relatively stable over the projection period. The 2016 population of 10,480 would potentially increase under the NS model, but these gains would be offset by out-migration. Under the HS Medium scenario a small decrease is projected, under the High scenario a small gain. In both the North East Avalon and Central Labrador the average age of the population will increase over the projection period, but not by as much as in most other regions.

The results present a challenging picture for most regions in the province. Most regional populations are projected to continue to decline and age over the 2016-2036 timeframe. For most regions birth rates are low and outmigration of the young and those females in their childbearing years mean that regional populations are not being reproduced. Out-migration, particularly of the young and those in the labour force, together with the relative immobility of older members of the communities and their increasing longevity, is reflected in declining numbers and aging regional populations. This situation is not new, for the last 20 years or more the demographic structure of the province has shifted from a rapid growth model, in which the population was sustained through natural replacement, to a no-growth model in which population stability or growth can only be achieved through in-migration. This is particularly true for rural Newfoundland and Labrador where many of the regions have been in decline for multiple census periods.

Among the issues arising are questions relating to labour markets - how will future demands for labour be met given a shrinking and aging labour supply? Similarly, changes in the number, age and geography of the population has implications on the demand for public, private and non-government sector services. What services, what levels of demands will be required and in which locations? In addition there are the problems of the cost and delivery of services in the current period of significant economic constraint. Here there are social as well as economic considerations to weigh and priorities to determine. How those decisions and effects are managed will require a strong, but sensitive government working with those affected.

As noted, the demographic changes ongoing in the province are not new and the issues that arise from those changes not surprising. The purpose of this report is to try to ensure that the current and projected demographic situation is clearly understood so that its implications can be recognized, more fully debated and appropriate actions considered. This report is thus intended as a source of information about the current and projected demographic situation and a baseline for further study about its implications. This report and others based on it that explore some of the key policy implications are available at

www.mun.ca/harriscentre/populationproject

TABLE OF CONTENTS

1.0 INTRODUCTION

Overall population growth or decline as well as change in the age structure of the population are major factors in decisions about infrastructure and program investments in, for example, schools, hospitals, roads, public transport, water supply, health, child and seniors care, and education and training. From an economic perspective population analysis it is important to determine if the demographic trends can help maintain the existing labour supply. If not, labour retention and in-migration will be important factors if future labour market demands are to be met and the *status quo* at least maintained. Where local economies cannot support their current populations, out-migration and lower population levels will result, requiring consideration of how the infrastructure and service needs of those who remain can best be met.

Any population forecast model therefore needs to be developed within a regional planning context insofar as the outcomes from a population forecast model should be capable of being integrated with other analytics to assess the impact on infrastructure and services and the region's ability to provide a labour supply to meet anticipated future requirements. This assessment and the identification of policy options to address those impacts are the primary objectives of the *Population Project*.

Population growth in a region is a function of its age structure and population trends (fertility, mortality, migration patterns, etc.), which themselves are influenced by such factors as:

- the state of the regional economy and labour demands;
- the level and quality of available private and public services;
- job prospects for new workers entering the labour market; and
- the availability of housing.

Thus, any population analysis has to consider the historical trends related to the age structure, fertility, mortality and migration associated with a region. In addition, examination of the age structure of a population along with aggregate population growth is important because many services are of greater relevance to certain age groups (cohorts). For example, growth in the 5-19 cohorts would put greater demands on schools and recreational services while the size of the 20+ cohort would give an indication of the potential demand for housing. At the other end of the age spectrum the 65+ cohorts would generate other types of demands, such as those relating to health care, associated with the needs of the older members of the population.

Within this context, the report presents the methods and outcomes associated with forecasting the population for the Province as a whole and 26 regions identified for the province (Figure 1.0) from the base year of 2016 to 2036.

Regions are defined using a tiered Functional Economic Region Classification (FER) system, which serves to define the study regions within an economic and potential growth context (see **Appendix II** for additional information on the FER Classification system). Based on a set of socio-economic indicators communities are grouped into regions according to their functional relationships.

The FER classes recognize Cities/Regional Towns and First, Second and Third Order rural communities. The classification recognizes that regions centred on small cities and regional towns, such as Corner Brook and Marystown, provide more services and opportunities for growth than smaller rural areas. By contrast, first order rural regions represent areas with smaller centres that provide some level of retail along with limited government services and have a fairly diversified economy with some potential for growth. However, second order rural regions have a total population of less than 2,000 people and provide very limited retail and government services and have limited potential for growth. Most second and third order rural areas are generally dependent on a single industry. Third order rural areas have populations of less than 600 people with only the most basic retail services available and usually lack government services.

The pattern of increased population concentration in larger places in remote and sparsely populated areas is a common trend in other northern and peripheral Canadian regions and, as elsewhere, this increased concentration has the greatest impact on the smallest places as even small population losses here can affect the viability of basic services, further jeopardizing the future of those communities.

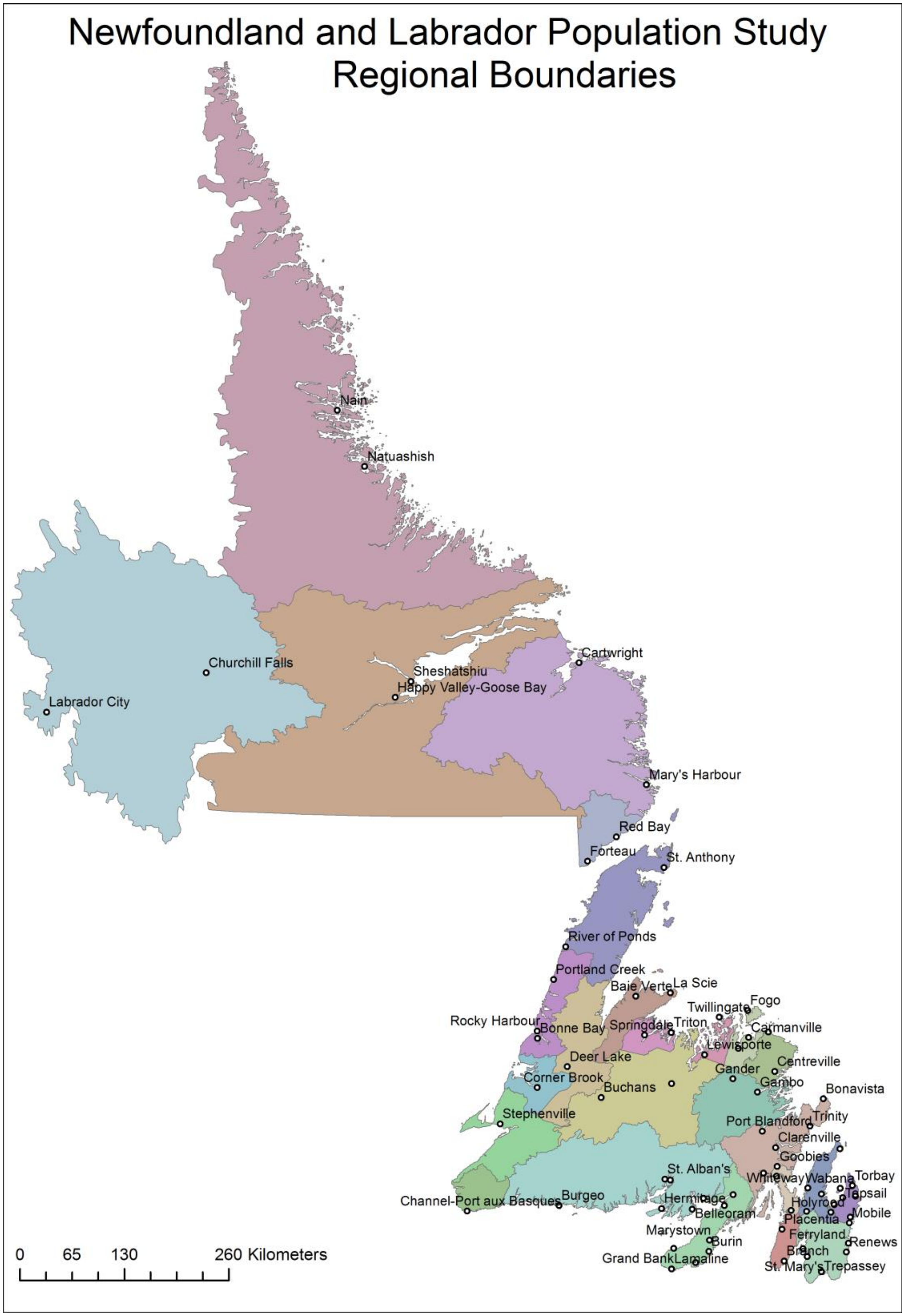


Figure 1.0: **Newfoundland and Labrador Study Regions**

2.0 METHODS

Population forecast models are used to predict the population count and age structure of a region at points in time from a known population. Predictions are based on assumptions about the number of births and deaths that will occur during each time period as well as the effects of in- and out-migration. The standard model for population analysis is the "cohort survival model" (Table 2.0). It is based on the idea of the cohort that represents a group of people in the same age category (e.g. 0-4, 5-9, 10-14 etc.). When individual age data are available, the model is referred to as an "age specific survival model". Thus, the future population of a cohort is based on how many in that cohort are expected to survive to reach another age. This is estimated by multiplying the initial population of the cohort by the survival rates for each successive cohort. The "survival rate" includes quantitative information on births, deaths as well as in- and out-migration.

For this study, the "age specific survival" model is used to assess the future trends in age structure and population change. The outcomes from this analysis provide baseline information that can be integrated with other models to assess impacts and structure policies for regional planning and development.

However, to develop population growth scenarios that are based on variations of model assumptions, the basic survival model is re-formulated with an optimization function. This re-formulation of the cohort model permits assessment of how changing the inputs to the model affect the long-term growth of the population. For example, the re-formulation allows the question of whether existing regional age structures, fertility, mortality and migration rates provide the required growth to meet future labour supply requirements in the economy. Within this model one can vary birth and death rates by age, together with in/out-migration patterns and by so doing estimate various growth scenarios for each region.

Three survival models are used to forecast outcomes that are used for analyzing the future population trends in Newfoundland. These are:

1) The **Natural Survival Model (NS)** where the in- and out-migration rates are set to zero and population change is dependent on age specific births and deaths only. Outcomes from this analysis provide information on a region's ability to maintain or increase future population levels given the combination of the region's age structure and expected fertility and mortality rates. If a region cannot maintain or grow its existing population through this natural replacement process it reflects underlying issues associated with fertility and death rates, youth retention and aging populations.

2) The **Historical (Cyclic) Survival Model (HS)** assumes existing age specific birth and death rates as in the NS model, but migration rates are set to cycle through periods of high and low growth, continuing the cyclic pattern of population changes as experienced during the last 10-15 years. The migration component of population change is decomposed into intra-provincial, interprovincial, international in-migration, and total out-migration. In addition, the migration calculation utilizes a "migration propensity" for each age group/region class/migration type combination, which ensures that migration volumes

remain sensitive to shifts in population levels over time. The cyclic models represent two different migration trend analyses in which:

a) the ***Medium cycle* model** represents a scenario where 2001 to 2006 (lower rate) and 2006 to 2011 (higher rate) migration trends alternate on 5 year cycles whereby 2012 to 2016 reflects the lower rate forecast and the 2017 to 2021 forecast is based on the higher rate. This alternating of lower and higher trends is repeated for the forecast period.

b) the ***High cycle* model** starts with the lower rate trend for 2012 to 2016 and uses the higher rate trend for the remaining forecast period.[1]

3) The **Replacement Survival Model (RS)** reflects net migration levels based on forecast replacement demands due to workforce aging, mortality, young worker entrants as well as attrition and unemployment rates. Firstly, retirements, worker deaths, and young workforce entrants over time are estimated using historical rates. Secondly, these values are combined to estimate the net in-migrants required to maintain the workforce population for each region, given historical trends of out-migration.

The RS projections are based on the integration of different worker replacement rates with a replacement success factor and are used to estimate Low, Medium, and High growth scenarios. For this model, values of 50% for low, 70% for medium, and 100% for high are assigned as constants for the required workforce replacement factor. The Medium cycle model migration trends are used in the illustrations of RS model outcomes.

Conceptually, replacement rates of less than 100% could still allow an existing economy to be sustained by increasing the productivity of the remaining workforce and/or the hiring of currently unemployed people if their skillsets matched industry requirements.

The model indicates what replacement levels are required to maintain the workforce population. It says nothing about how these replacement levels may be achieved. In regions characterized by high levels of out-migration, reversing that process and encouraging in-migration maybe very difficult. Policies that encourage retention of working-age members of the population may have more chance of success, but these too may not be easily achievable.

1) The high cycle model is based on assumptions used by some provincial governments whereby the first five years of the forecast is based on a five-year low migration trend and the remaining 15 years are based on a high five-year trend. Note that in the model migration is decomposed into inter/intra provincial and international migration factors. In all cases out migration trends are a single factor and cannot be decomposed by destination.

Table 2.0: **Structure of the Cohort Survival Model**

Cohort Survival Model					
Age Group	Base Year Population	Fertility Rate	Mortality Rate	Net Migration	Future Population
0-4	P_0	FR_0	MR_0	NM_0	
5-9	P_1	FR_1	MR_1	NM_1	$P_0FR_0MR_0+NM_0$
10-14	P_2	FR_2	MR_2	NM_2	$P_1FR_1MR_1+NM_1$
15-19	P_3	FR_3	MR_3	NM_3	$P_2FR_2MR_2+NM_2$
…	…	…	…	…	…
…	…	…	…	…	…
…	…	…	…	…	…
80-84	P_{16}	FR_{16}	MR_{16}	NM_{16}	$P_{15}FR_{15}MR_{15}+NM_{15}$
85+	P_{17}	FR_{17}	MR_{17}	NM_{17}	$P_{16}FR_{16}MR_{16}+NM_{16}$

The assumptions regarding fertility, mortality and migration for the survival models (see Appendix I for list of these assumptions) are based on three levels of geography. For the purpose of population analyses, all three geographies can be aggregated, decomposed or integrated using Statistics Canada's census geographies (e.g. census subdivisions or census-consolidated subdivisions).

Two of these geographies are entities created by the Newfoundland and Labrador Provincial Government Statistics Agency (Local Areas) and the Department of Health and Community Services (Regional Health Authorities). The Local Areas geography is a combination of Statistics Canada's Census Consolidated Subdivisions (CCS) (80 Local Areas) and there are four Regional Health Authorities – Eastern, Central, Western and Labrador-Grenfell.

The third level of geography is based on Simms *et al.* (2013), a methodology that defines five types of functional economic regions (FERs) for Newfoundland and Labrador, and that delineates regional boundaries by using a distance-constrained regional analytics model that ensures at least 90% of the daily labour market commuting occurred within the regional boundaries.[2] The final classification for region types utilizes an urban hierarchy-type model, as well as a grouping function that uses socio-economic characteristics whereby the intra-regional variability is minimized while maximizing inter-regional variability (see Appendix II for more

2) FER geography is based on the 2011 Statistics Canada Census Subdivisions (CSDs).

information). The results produce a consistent regional taxonomy that fits the geography and regional economy of Newfoundland and Labrador as well as the Maritime provinces.

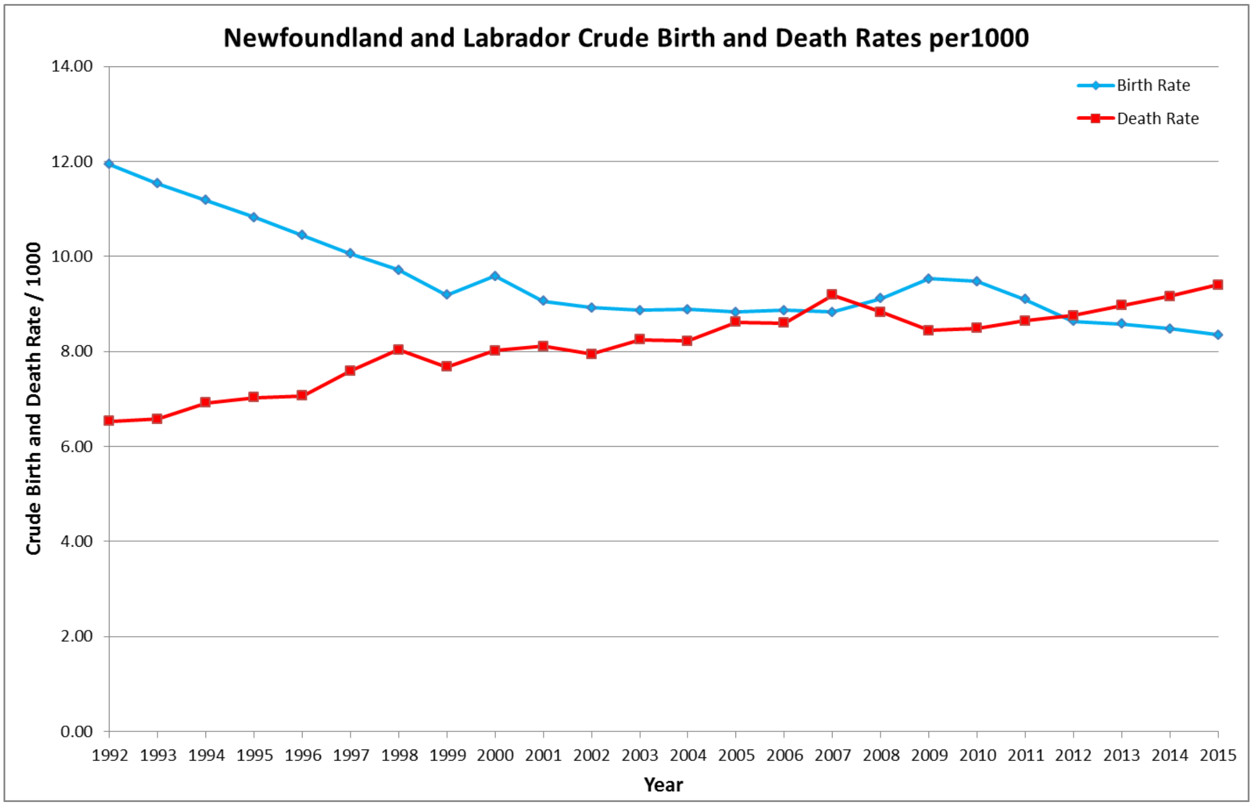
For the purpose of this study, fertility rates are based on the NL Statistics Agency's Local Area geography because of issues with data availability or suppression, by community, and because missing data did not produce data issues at this scale. However, death and migration rates are aggregated to five FER regional classes to avoid small data issues when calculating migration trends[3].

The Local Area fertility rates for the overall study area range from a high of 2.8 to a low of less than 1.0. A rate of 2.1 is required to maintain the 2016 population levels. However, a population with a very low or high proportion of females in the 24 to 34-age cohort will impact the outcomes in the natural growth component of the model.

Death rates are fairly consistent and the increasing number of deaths is due to an aging population rather than a significant change in the mortality rate. Given the decline in births and the increasing number of deaths due to an aging population (Figure 2.0) in-migration is, for many areas in Newfoundland and Labrador, the only potential source of future growth. However, the propensity for younger cohorts to out-migrate from smaller rural areas to larger centres creates a retention problem and contributes to population decline in those smaller rural areas. For example, when analyzing the 2011 provincial migration trends, 65% of the out-migrants from Third Order Rural areas are less than 35 years of age while only 8% are 65 years or older. These patterns are associated with the characteristics of Third Order Rural areas, many of which are dominated by single industry communities with populations of less than 600 people, have limited opportunities for young workers and have generally have been in chronic decline for multiple census periods. The "propensity-to-migrate function" in the models account for the fact that younger cohorts are more mobile than older cohorts.

The survival models are designed to work at multiple levels of geography and population forecasts can be quickly generated as more detailed or updated data become available.

3) These issues are especially evident for the Island part of the province. In this case when a Local Area is "completely contained" within a FER region type is it is assigned the death rate for that that FER.



Source: Statistics Canada Births and Deaths by Province

Figure 2.0: **Crude Birth and Death Rates 1992 to 2015**

The three models used in the analysis follow "best practice" as identified by Statistics Canada and provincial governments[4]. However, like any population projection analysis, these models are constrained by the assumptions made and all outcomes should be interpreted as what would happen *if* the assumptions hold throughout the forecast period. Thus, the final projections may not be what actually happen because of unforeseen factors related to the economy, government policies as well as random short-term decreases/increases in fertility or mortality. The random factor is especially influential on smaller regions. Overall, the outcomes from the models are reflections of observed trends and where there is a propensity to grow, decline or age it will be captured in the projections, even if the population numbers are under- or over-estimated.

All data used in the models were either downloaded from the Newfoundland and Labrador Statistics Agency Community Accounts or Statistics Canada 2016 Census and CANSIM data portals.

4) A good example of best practices is the British Columbia Statistics report on "Population Extrapolation for Organizational Planning with Less Error (P.E.O.P.L.E)", Population Section, BC Statistics, Ministry of Finance and Corporate Relations, Government of British Columbia, August, 1999

3.0 POPULATION FORECASTS 2016 TO 2036

The following sections present outcomes from the Natural (NS), Historical (Cyclic) (HS) and Replacement Survival (RS) models. Included are total populations by year, study region tables, percent change temporal trend graphs for the NS model, and selected trends for both the HS and RS Models. The baseline population data used for the forecast are the Statistics Canada age specific 2016 census population count data. For each study region, the NS as well as the Medium and High HS projected age distributions for 2016, 2026 and 2036 are also included. As will be seen, although the RS model essentially maintains the population through in-migration, the age structures forecast remain relatively close to the HS outcomes. This is due to the fact that the HS migration cycles are an integral part of the RS model.

3.1 Newfoundland and Labrador

The baseline 2016 population for the province is 519,880. The NS model indicates that the population age structure in relation to birth and death rates cannot maintain the overall population with predicted values of 502,901 for 2026 and 467,676 for 2036 (Table 3.0). This trend is also present if recent migration trends are included. The HS model predicts a decreasing population over time whereby the population will drop to 509,612 by 2026 and to 479,907 by 2036 under the medium scenario.

If replacement strategies were to be implemented successfully, the province's population would still decline regardless of the amount of replacement. By 2036, the 50% (Low) RS scenario predicts a population decline to 487,696 while the 100% (High) RS scenario predicts a decline to 505,645 (Table 3.0). These outcomes indicate a need for a long-term population strategy that focuses on more than just workforce replacement if the region's overall population is to be maintained or grow.

Table 3.0: **Newfoundland and Labrador: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	519880	519880	519880	519880	519880	519880
2017	517580	519601	519601	518258	518597	519104
2018	516441	520501	520501	517862	518544	519566
2019	515252	521359	521359	517417	518445	519988
2020	513855	522011	522011	516778	518156	520223
2021	512371	522558	522558	516050	517781	520378
2022	510773	520308	522986	515222	517309	520439
2023	509054	517911	523274	514282	516727	520393
2024	507180	515347	523400	513209	516013	520219
2025	505112	512563	523307	511967	515132	519880
2026	502901	509612	523046	510603	514130	519422
2027	500448	508980	522543	509059	512950	518788
2028	497714	508056	521741	507295	511551	517935
2029	494724	506853	520654	505338	509959	516891
2030	491514	505419	519329	503227	508214	515694
2031	488092	503783	517793	500987	506340	514369
2032	484432	499399	516000	498592	504311	512890
2033	480555	494820	513993	496062	502147	511274
2034	476419	489978	511704	493355	499806	509482
2035	472110	484982	509243	490550	497366	507589
2036	467676	479907	506685	487696	494876	505645

Note: Table row values for **Year 2016** is the baseline population for all model estimates

Figure 3.0 indicates that the NS model trend predicts negative percent differences from the 2016 baseline – specifically that the population decreases by 10.04% by 2036. Thus, based solely on projected birth and death rates, the population will continue to decrease at an increasing rate. When past migration pattern data are included, the HS model also predicts an overall population decline. By 2026 it will have declined by 1.98% and by 7.69% by 2036.

The third element of Figure 3.0 illustrates the effect of replacing those in the workforce who retire, die or leave the region. The Medium Replacement scenario illustrated indicates what would happen if 70% of the "lost" workforce were to be replaced. In this case the population would decline by 1.11% by 2026 and by 4.81% by 2036.

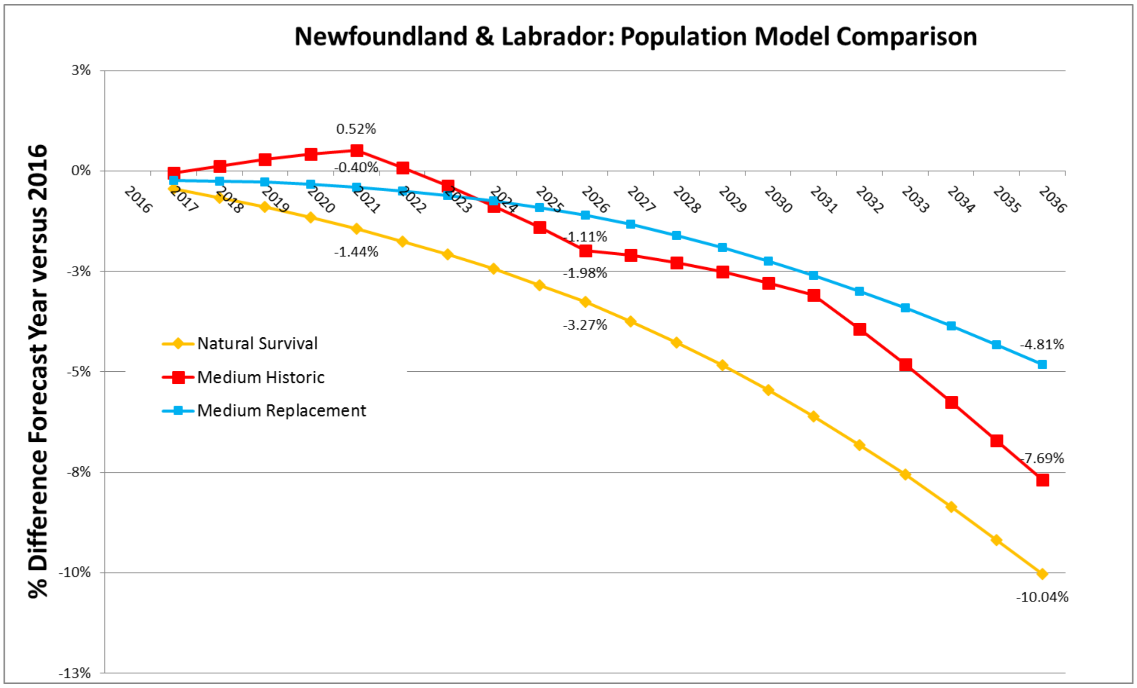


Figure 3.0: **Newfoundland and Labrador: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

Workforce replacement could occur primarily through retention of those who might otherwise leave the region, or by in-migration. Experience suggests that while neither may be easy to achieve, retention may be easier than attracting new in-migrants, unless there is a significant increase in economic opportunities that would attract migrants. The RS model predictions thus indicate what would be *necessary* to maintain or grow the population in the long term. It says nothing about how this might be achieved, or how successful any strategies implemented might be.

If nothing is done to replace the workforce population, the HS model provides the most likely scenario for the projection period. From a policy perspective, this implies that government has to consider how it can best meet the needs of the province in the future, needs that are complicated by an increasingly aging population in the province as a whole.

Figure 3.1 presents the 2016 and predicted 2036 age profile for the province whereby predictions for 2036 show that the effects of migration, as indicated by the differences between the NS and HS cycle scenarios, vary by age cohort. The high HS scenario shows a slightly positive migration impact for the less than 25 years age cohorts and those over 40, with these effects narrowing for the oldest age groups.

Figure 3.1 also shows an older population by 2036, as compared to 2016. This trend is evident with a shift in the average age of the population from 43 years in 2016 to 48 by 2036, as predicted by the Medium HS model.

This overall provincial-wide picture may hide the effects of differences in population structure and migration propensities in the province's regions. To address this, regional projections for the province are presented in the following sections.

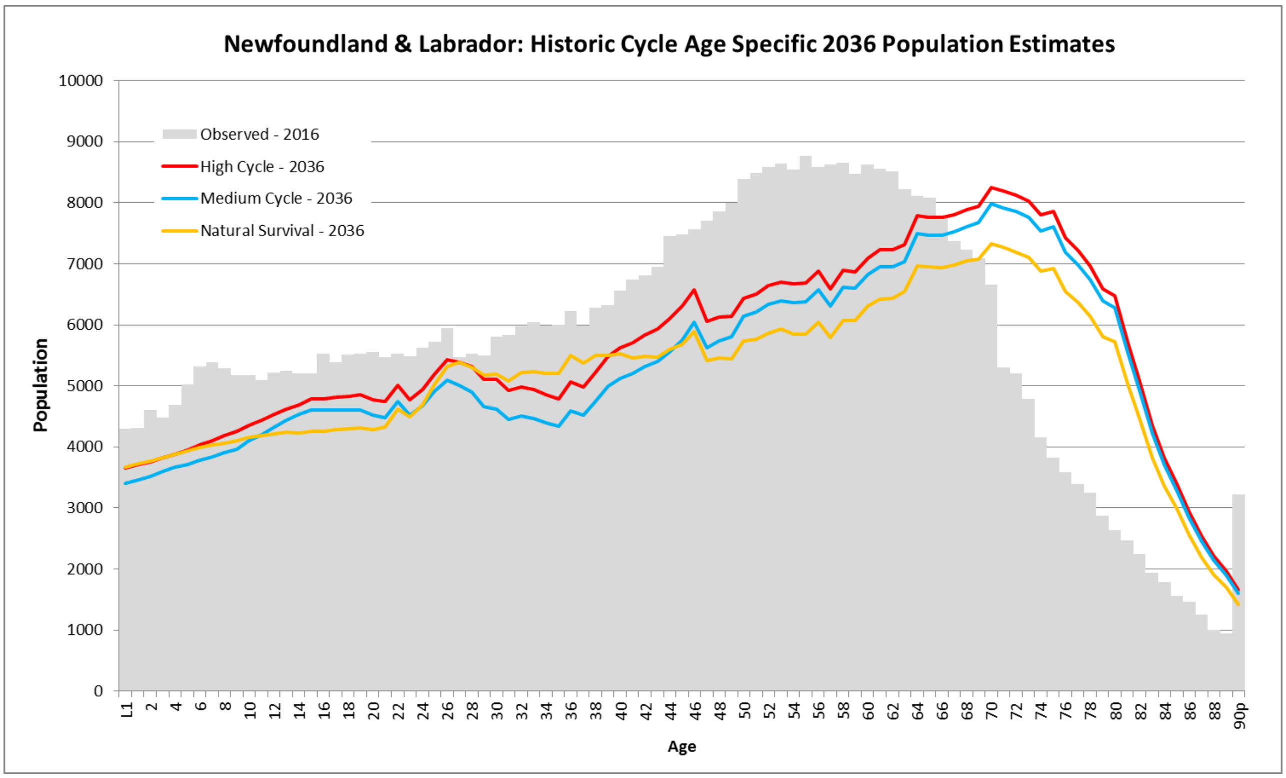


Figure 3.1: **Newfoundland and Labrador: Observed Versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.2 River of Ponds – Roddickton Area

The 2016 baseline population for the River of Ponds – Roddickton Area region (Figure 3.2) is 11,290.

Figure 3.2: **River of Ponds – Roddickton Area.**

The NS model suggests that the population would decrease to 10,667 by 2026 and to 9,653 by 2036 (Table 3.1). This suggests that the population components of birth and death rates do not have the natural ability to sustain this region's population. This predicted population decline is magnified when migration effects are included. The HS outcomes for Medium and High migration trends both indicate that if historic migration cycles repeat in the future, and there is no population replacement policy, the population would decrease significantly. In this case, the HS model outcomes suggest the population would decrease from 9,054 in 2026 to 6,761 by 2036 under the Medium scenario and decrease to 7,119 by 2036 under the High scenario (Table 3.1).

The results for the RS model show different outcomes. Under the Low RS scenario (50% replacement) the population would decline, under the Medium RS scenario (70% replacement) it would remain almost stable, but would grow under the High RS model (Table 3.1). These RS models represent target numbers indicating what would be required for population stability and growth.

***Table 3.1:* River of Ponds – Roddickton Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	11290	11290	11290	11290	11290	11290
2017	11245	11089	11089	11270	11282	11300
2018	11175	10871	10871	11237	11262	11298
2019	11115	10668	10668	11219	11256	11311
2020	11051	10466	10466	11201	11251	11325
2021	11002	10279	10279	11199	11262	11355
2022	10940	10031	10081	11190	11266	11379
2023	10867	9778	9876	11176	11265	11397
2024	10797	9530	9674	11167	11268	11420
2025	10737	9291	9479	11165	11279	11451
2026	10677	9054	9284	11164	11291	11483
2027	10602	8854	9079	11155	11296	11508
2028	10514	8648	8867	11140	11294	11526
2029	10431	8444	8658	11129	11297	11548
2030	10342	8238	8448	11116	11297	11569
2031	10249	8031	8236	11103	11297	11589
2032	10146	7779	8019	11085	11293	11605
2033	10035	7525	7798	11065	11287	11619
2034	9912	7268	7571	11041	11276	11629
2035	9789	7015	7347	11019	11267	11641
2036	9653	6761	7119	10992	11255	11648

Note: Table row values for **Year 2016** is the baseline population for the survival model estimates.

When examining the growth or decline as a percentage change of the 5-yearly forecast versus the 2016 baseline population (Figure 3.3), the NS model outcomes always exceed the HS Medium Model estimates. For example, by 2026, under the NS model estimates the population decreases by 5.43% while the medium HS model, which includes migration, indicates that there would be a 19.8% decline in the population for the same period. This discrepancy widens by 2036 with the NS model estimate at -14.5% and the HS model estimate at -40.11%. These results show the major impact that out-migration has on model outcomes if historic trends continue.

Under the Medium RS Model there would be a 0.01% increase by 2026 and a 0.31% decrease by 2036. The predicted RS Model population growth is greater than that for the NS model indicating that if the region can replace 70% of the workforce that is lost to retirement, out-migration, etc., it would mitigate the population decline predicted by the NS and HS models.

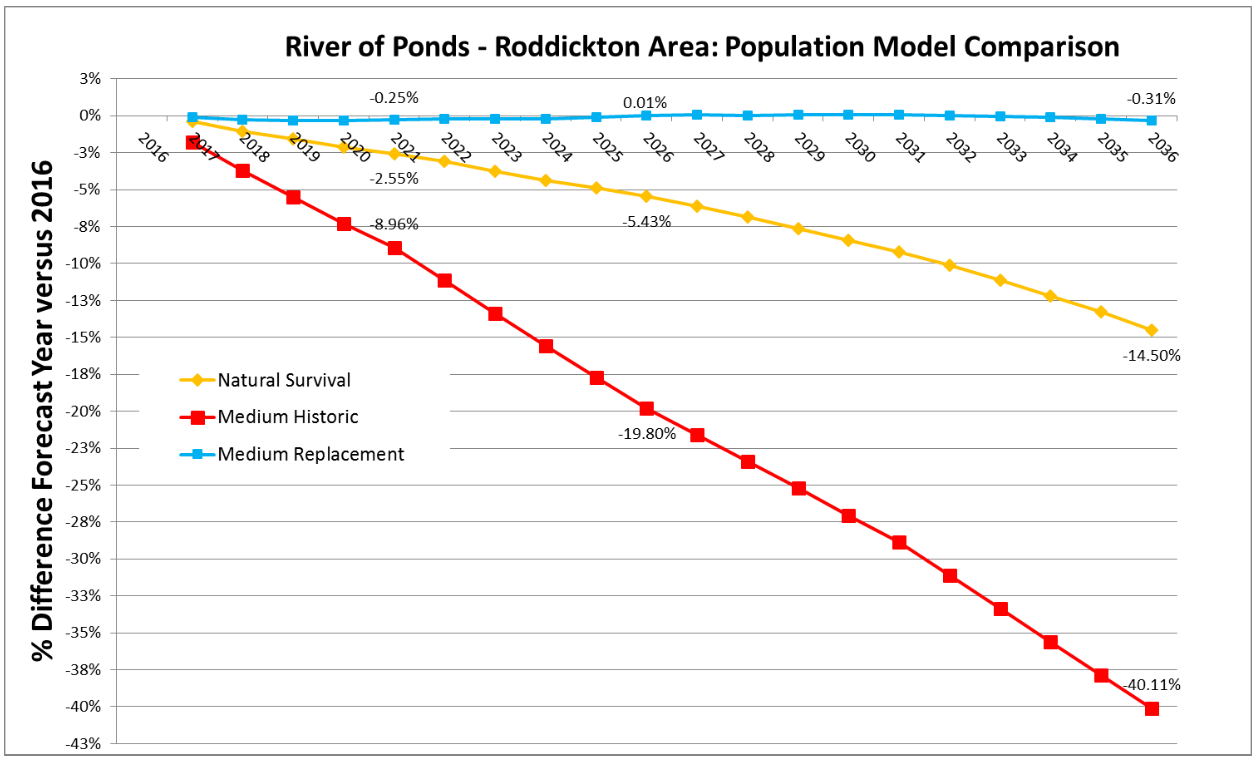


Figure 3.3: **River of Ponds – Roddickton Area: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

Figure 3.4 presents the region's projected population age structure for 2036. The 2016 baseline data are presented together with Medium and High HS projections. For the 2036 outcomes, there is very little difference between the Medium and High HS scenarios, but there is a greater difference between the HS and NS scenarios. The difference between these two models indicates that the migration factor has a significant influence on the model outcomes.

The NS outcomes also suggest that if the regional birth and death rates remain constant over time, there is a shift to an older age structure by 2036 (Figure 3.4). For example, the average age in 2016 was 48 years, but the Medium HS model predicts by 2036 this will increase to 54 years.

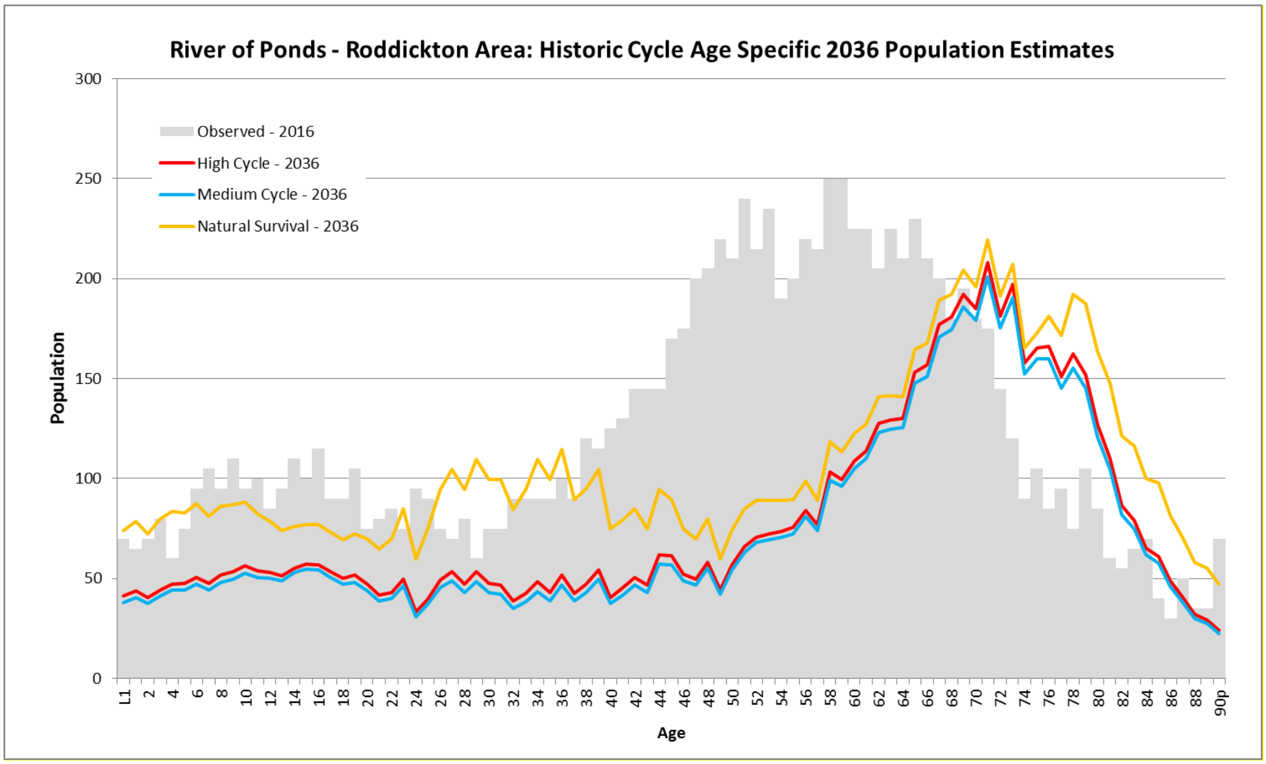


Figure 3.4: **River of Ponds – Roddickton Area: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.3 Gros Morne Area

The 2016 baseline population for the Gros Morne Area (Figure 3.5) is 4,350.

Figure 3.5: **Gros Morne Area.**

The NS Model indicates that without migration as a factor the population will decrease to 4,081 by 2026 and further decrease to 3,598 by 2036 (Table 3.2). This indicates that under the assumptions for fertility and death rates this area cannot maintain its population through natural replacement. With the introduction of a migration factor, the Medium HS Model indicates that the population would decrease to 3,604 by 2026 and 2,724 by 2036.

The RS model scenarios predict a population that ranges from 4,024 (Low scenario) to 4,266 (High scenario) by 2036. None of the replacement assumptions would result in an overall increase in population.

Table 3.2: **Gros Morne Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	4350	4350	4350	4350	4350	4350
2017	4351	4307	4307	4360	4365	4371
2018	4331	4244	4244	4352	4361	4375
2019	4301	4174	4174	4336	4350	4371
2020	4265	4099	4099	4317	4336	4364
2021	4243	4036	4036	4310	4334	4369
2022	4212	3949	3967	4298	4326	4368
2023	4176	3859	3894	4281	4314	4364
2024	4145	3774	3825	4269	4307	4364
2025	4106	3685	3752	4252	4295	4360
2026	4081	3604	3686	4244	4292	4364
2027	4038	3528	3608	4225	4278	4357
2028	4001	3454	3533	4210	4267	4354
2029	3958	3377	3453	4191	4253	4347
2030	3913	3298	3373	4171	4239	4340
2031	3866	3217	3291	4150	4222	4331
2032	3813	3118	3204	4125	4202	4318
2033	3759	3018	3116	4099	4181	4305
2034	3711	2922	3031	4076	4163	4294
2035	3654	2822	2941	4050	4142	4280
2036	3598	2724	2852	4024	4121	4266

Note: Table row values for Year 2016 is the baseline population for the survival model estimates.

Population growth rates relative to 2016 are shown in Figure 3.6, where the NS, Medium HS and Medium RS models all show decreasing growth rates long term. The NS model outcomes confirm that, given the 2016 age structure along with the existing birth and death rates, the population does not have the internal natural components to maintain growth. Without a migration factor, the population would decline by 17.28% by 2036. The Medium HS outcome, which includes a migration component, indicates a more dramatic decline in growth of 37.39% by 2036. The Medium RS model outcome shows a decline of 5.27% by 2036.

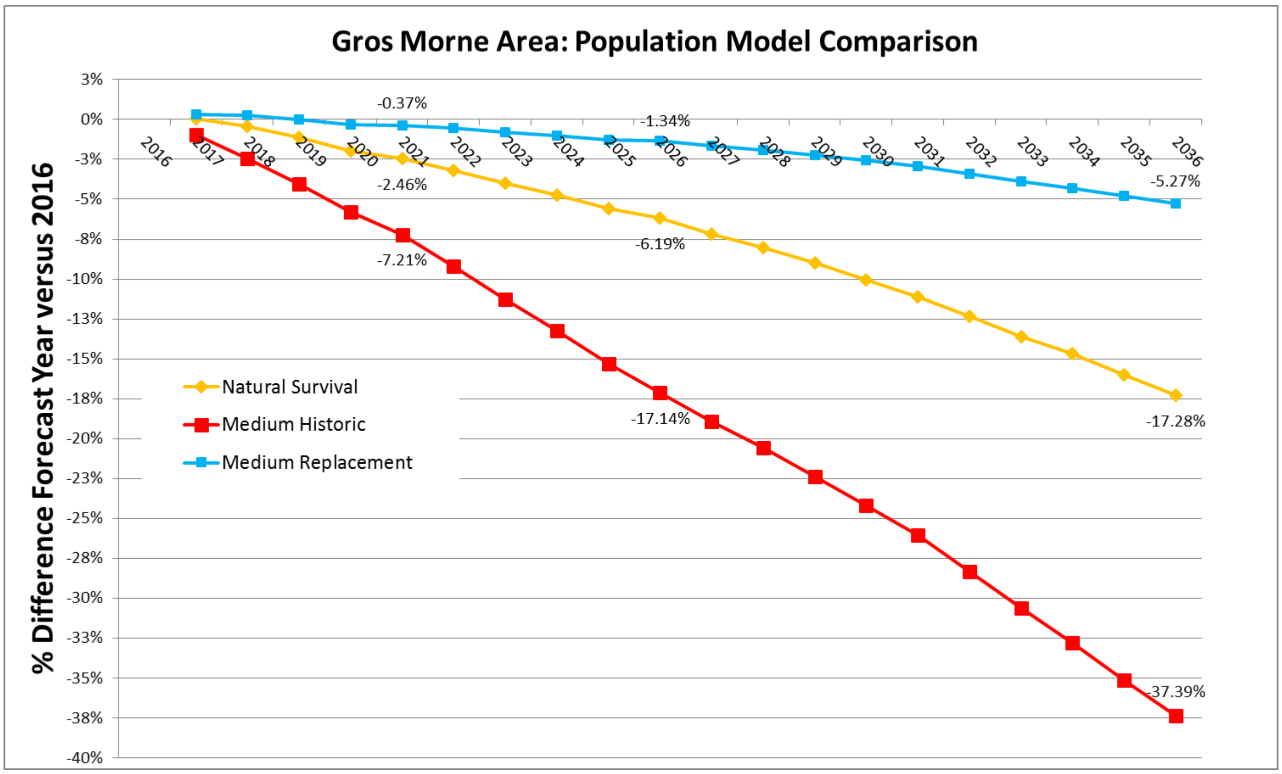


Figure 3.6: **Gros Morne Area: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

The 2016 observed age cohorts for the Gros Morne area, as well as the projected NS and HS age structures for 2036, are presented in Figure 3.7. The difference between the NS and HS lines shows the impact of migration. The biggest difference between these two models, and therefore the largest migration impact, is for the 25-45 year old age cohort. For older age cohorts, the NS and HS model outcomes become very similar.

The projected age structure for 2036 indicates that if the birth, death and migration cycles continue without replacement, the population will age significantly. For example, the average age in 2016 was 48 years. The Medium HS results indicate that this will increase to 57 years by 2036.

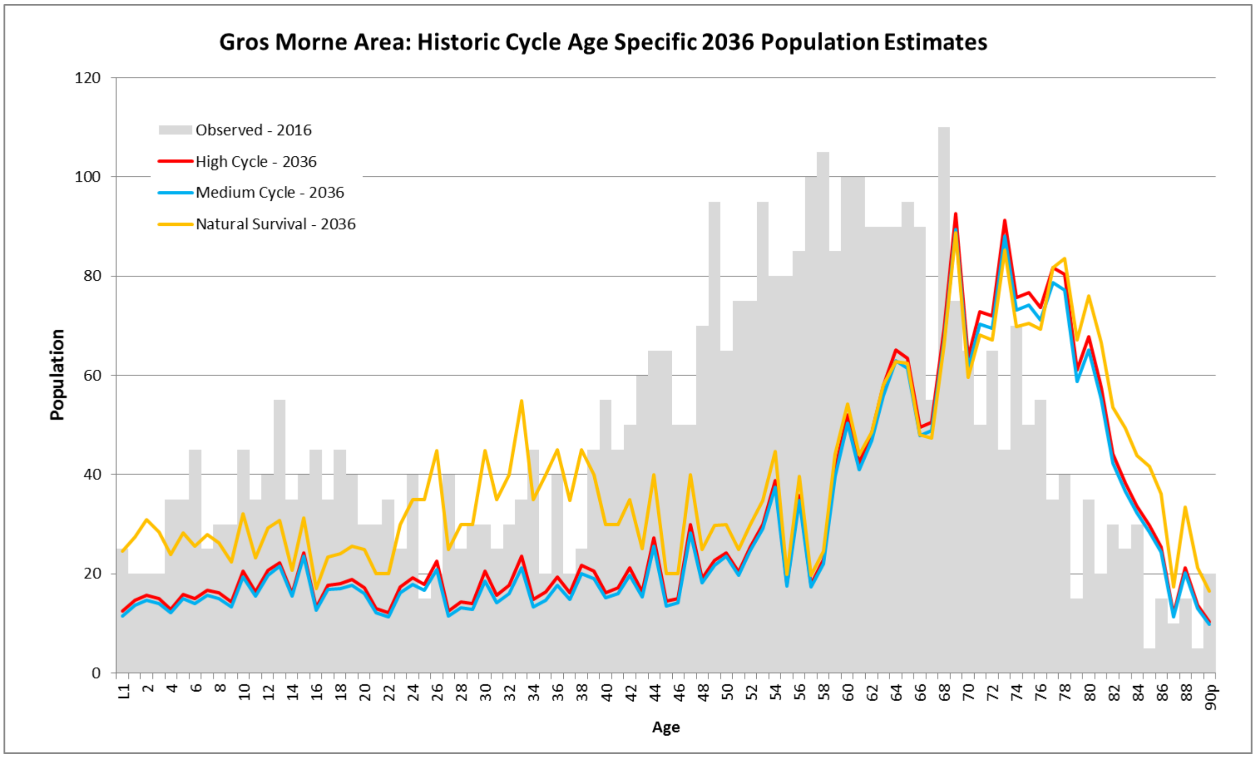


Figure 3.7: **Gros Morne Area: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.4 Deer Lake – Jackson's Arm Area

The 2016 baseline population for the Deer Lake – Jackson's Arm Area (Figure 3.8) is 8,275.

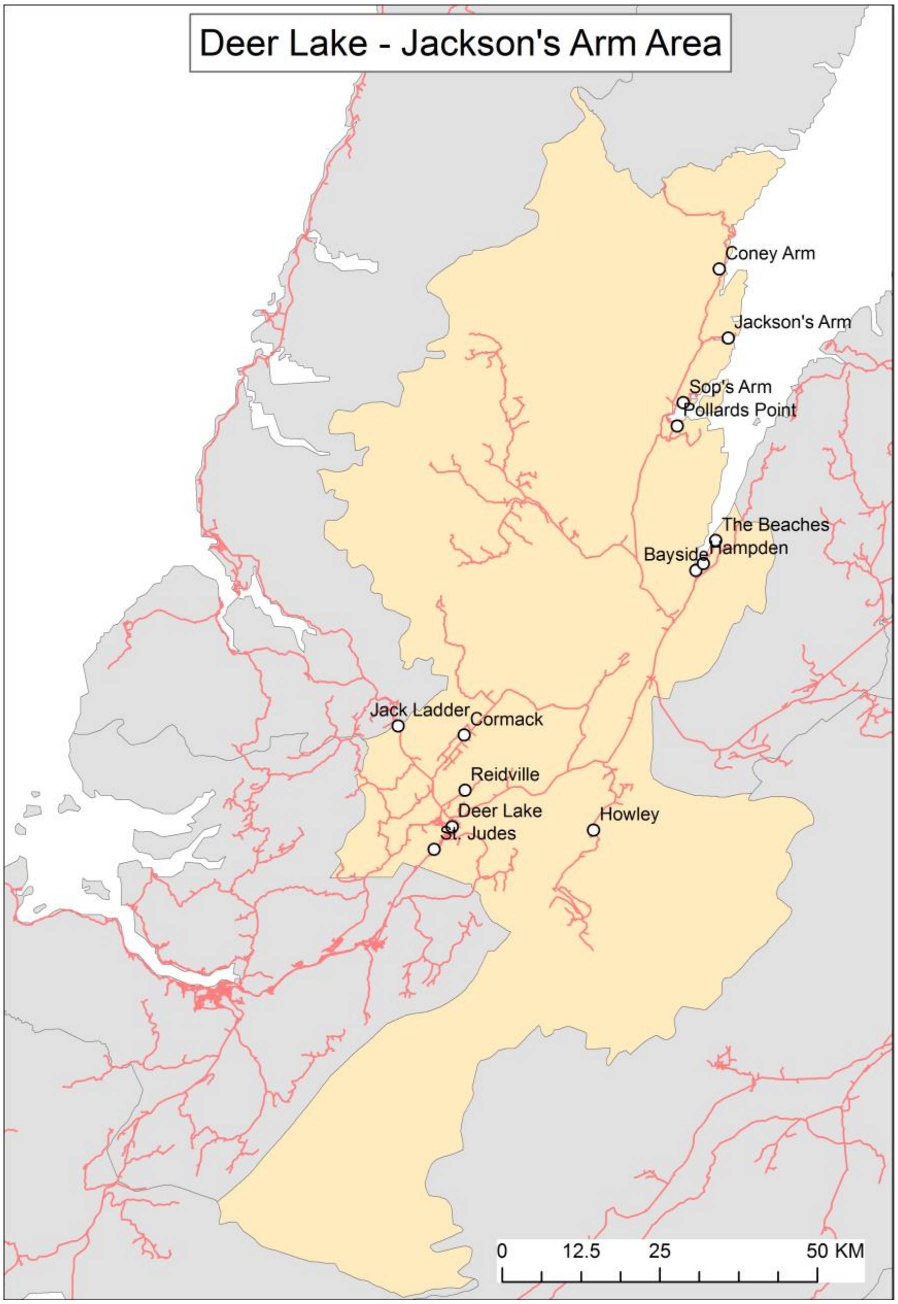


Figure 3.8: **Deer Lake – Jackson's Arm Area.**

The NS model for the Deer Lake – Jackson's Arm Area estimates a population of 6,975 by 2036, while the HS model (Medium scenario) estimates a population of 6,505, each of which represents a decline (Table 3.3). For the same period, the RS model predicts a population decrease in the Low scenario to 7,325 and to 7,660 in the High case. This is the overall result of lower fertility rates for the region and out-migration factors. Even with a strategy to replace 100% of the retired work force, the population cannot be maintained at its 2016 level.

Table 3.3: **Deer Lake – Jackson's Arm Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	8275	8275	8275	8275	8275	8275
2017	8217	8225	8225	8230	8237	8246
2018	8157	8171	8171	8185	8197	8217
2019	8112	8132	8132	8155	8174	8203
2020	8063	8088	8088	8121	8147	8186
2021	8010	8039	8039	8084	8117	8165
2022	7952	7944	7983	8044	8083	8141
2023	7895	7847	7926	8003	8049	8117
2024	7835	7748	7864	7960	8013	8092
2025	7776	7647	7801	7918	7977	8066
2026	7715	7542	7734	7873	7939	8038
2027	7656	7478	7669	7832	7904	8013
2028	7588	7401	7593	7782	7861	7981
2029	7521	7324	7515	7732	7819	7948
2030	7450	7241	7431	7680	7773	7913
2031	7380	7155	7346	7626	7726	7876
2032	7310	7033	7258	7572	7679	7839
2033	7232	6906	7164	7514	7627	7797
2034	7149	6775	7065	7453	7573	7754
2035	7060	6637	6958	7387	7514	7705
2036	6975	6505	6857	7325	7459	7660

Note: Table row values for Year 2016 is the baseline population for the survival model estimates

For all yearly predictions, the NS, Medium HS, and Medium RS models all indicate a continual population decline if historical trends continue. This predicted population decline is supported by the percent change trends displayed in Figure 3.9.

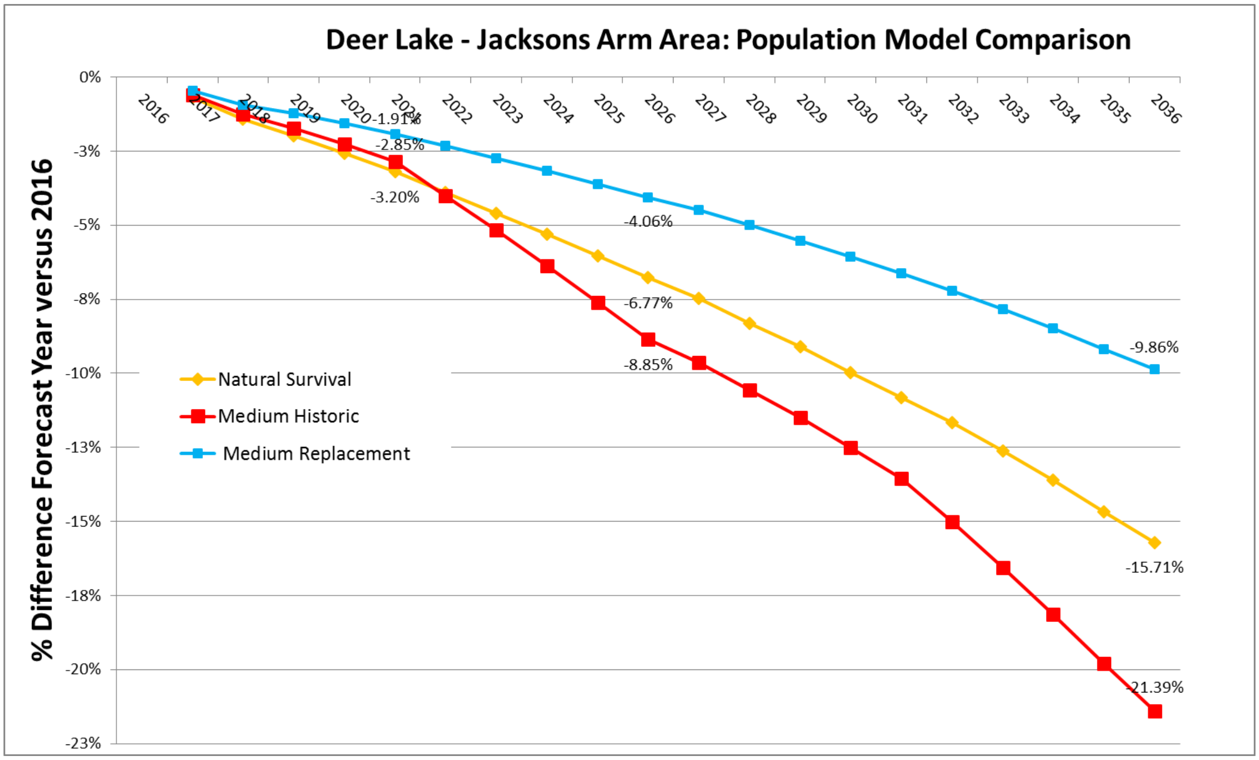


Figure 3.9: **Deer Lake – Jackson's Arm Area: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

The NS percent difference is -6.77% in 2026 and -15.71% by 2036. The Medium HS model indicates that out-migration is a major factor in which the overall loss in population by 2036 is projected to be 21.39% by 2036. Under the Medium RS model assumptions, the 2036 percentage difference from the 2016 baseline would be -9.86%. Even if 100% retiree replacement were to be achieved through a strategy to attract and/or retain workers, this region would not be able to maintain its labour force at 2016 levels given the assumed trends for births, deaths and migration.

The 2016 age structure, along with the 2036 prediction, is presented in Figure 3.10. This figure highlights an age structure typical of a slow growth, aging population with lower births and increasing longevity. An increase in the average population age from 45 years in 2016 to 51 years by 2036 is projected based on the Medium HS model.

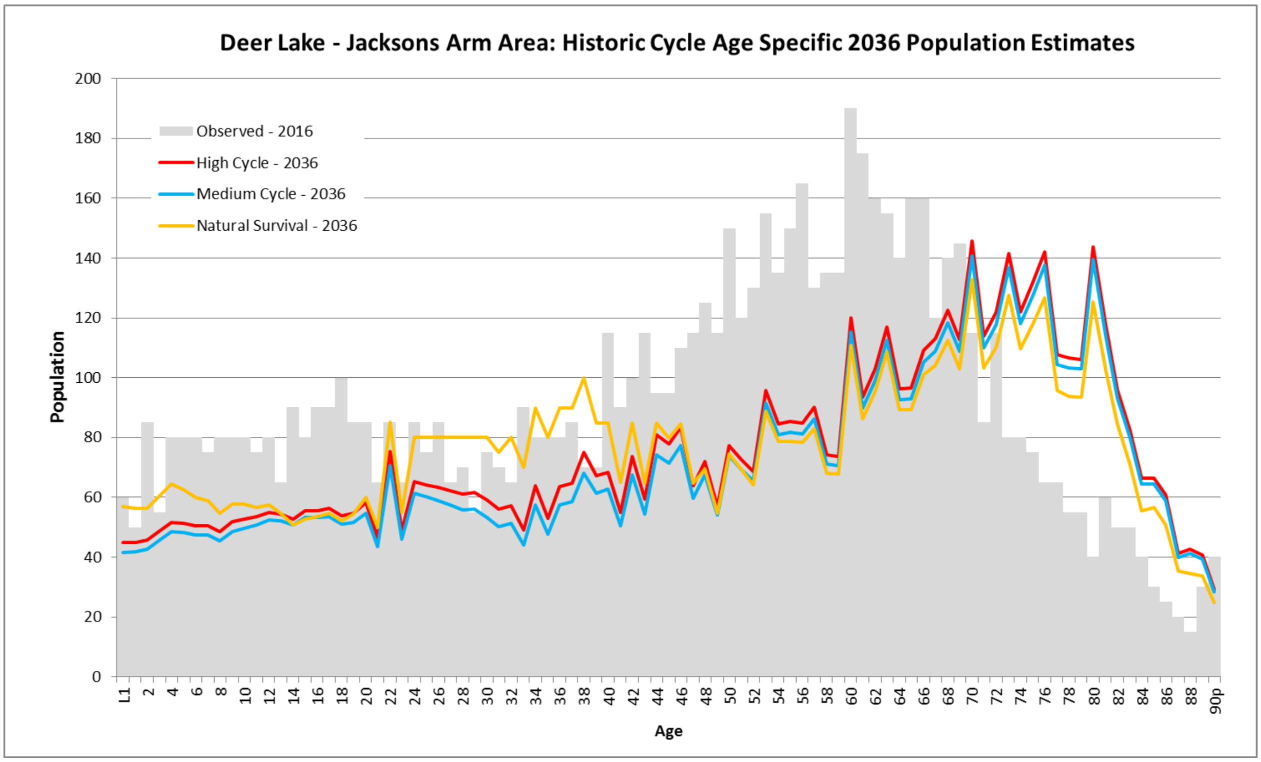


Figure 3.10: **Deer Lake – Jackson's Arm Area: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.5 Corner Brook Area

The 2016 baseline population for the Corner Brook Area (Figure 3.11) is 33,875.

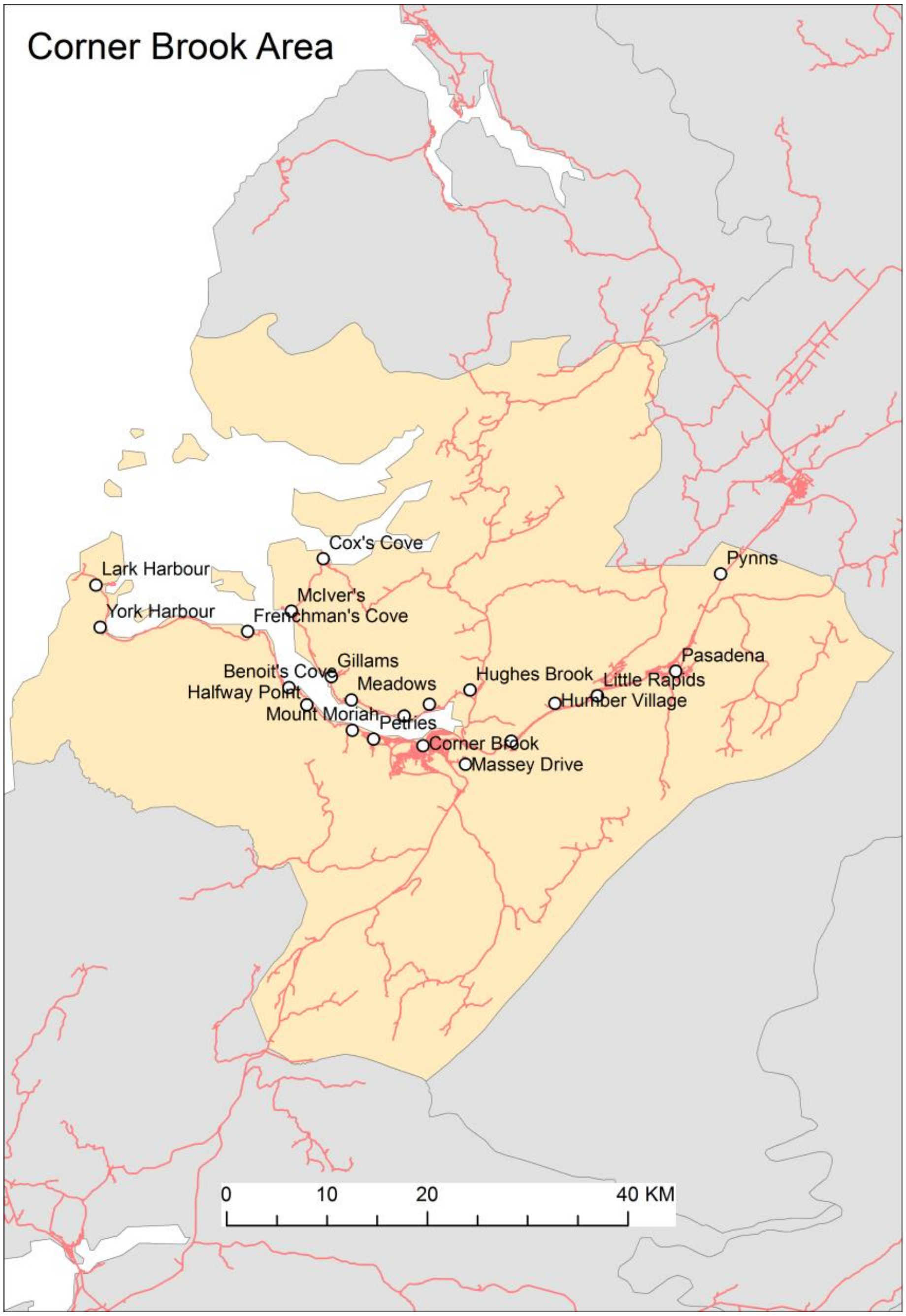


Figure 3.11: **Corner Brook Area.**

The NS model for the Corner Brook Area estimates a smaller population of 29,813 by 2036 (Table 3.4). The Medium HS model also estimates a population decline to 28,182 by 2036. For the same period, the RS model predicts a population decrease in the Low scenario to 30,736 and to 31,922 in the High case. Once again, this predicted population decline is the overall result of lower fertility rates for the region and out-migration factors.

Table 3.4: **Corner Brook Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	33875	33875	33875	33875	33875	33875
2017	33552	33601	33601	33600	33623	33657
2018	33400	33492	33492	33494	33539	33607
2019	33288	33419	33419	33426	33494	33596
2020	33147	33309	33309	33327	33419	33556
2021	33013	33202	33202	33234	33349	33521
2022	32859	32899	33069	33120	33259	33466
2023	32708	32595	32934	33008	33170	33412
2024	32556	32286	32791	32892	33078	33356
2025	32398	31966	32637	32769	32979	33293
2026	32228	31632	32466	32636	32870	33220
2027	32049	31441	32278	32494	32751	33138
2028	31857	31231	32070	32340	32622	33044
2029	31651	31003	31845	32175	32481	32939
2030	31423	30747	31590	31992	32321	32816
2031	31189	30483	31327	31805	32159	32690
2032	30942	30052	31045	31610	31988	32555
2033	30676	29599	30739	31400	31802	32405
2034	30400	29139	30421	31186	31612	32251
2035	30112	28666	30088	30964	31414	32090
2036	29813	28182	29739	30736	31211	31922

Note: Table row values for **Year 2016** is the baseline population for the survival model estimates

For all yearly predictions, all three models (NS, HS, and RS) predict continual population decline if historical trends continue. This conclusion is supported by the predicted percent change trends displayed in Figure 3.12, where the NS model trends indicate no capacity to maintain population growth (-11.99% by 2036), outmigration (HS Medium scenario model) will increase the population loss (-16.81%) and the Medium replacement (RS model) (-7.87%) will not be able to compensate to help maintain the labour force at its 2016 level.

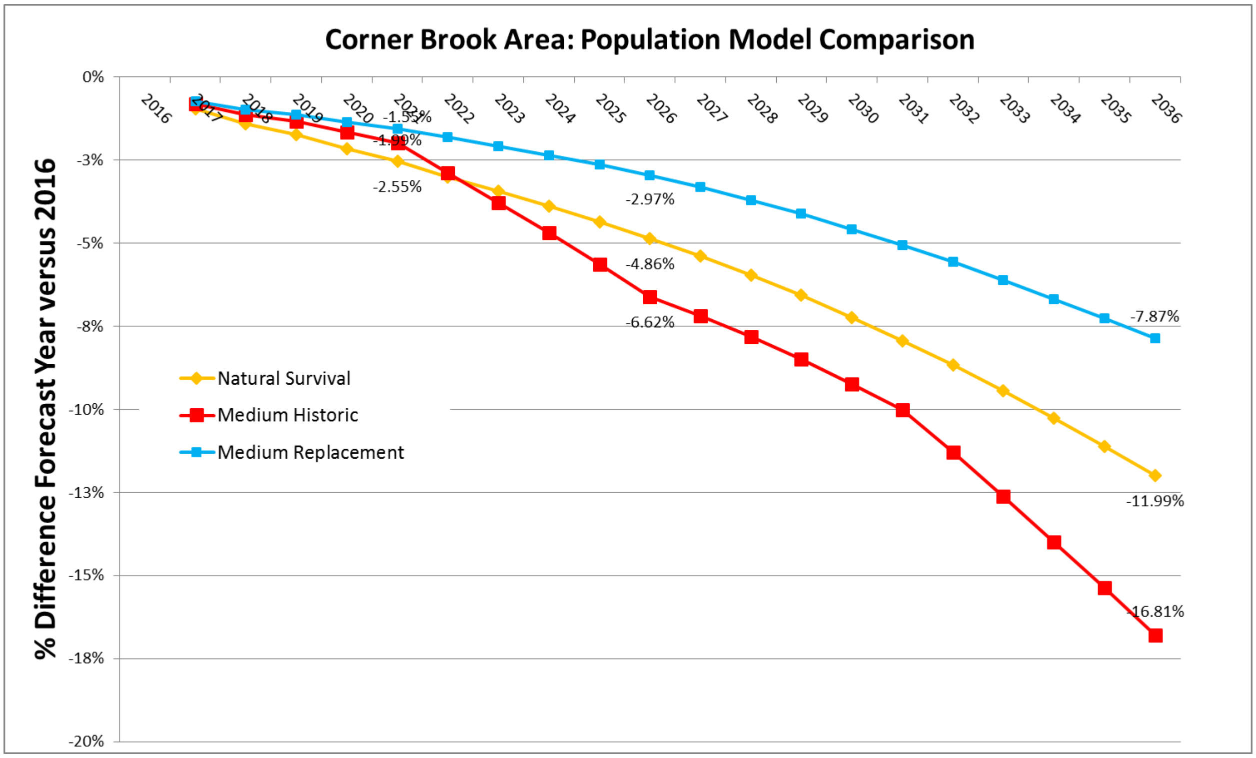


***Figure 3.12:* Corner Brook Area: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

The 2016 age structure presented in Figure 3.13 is indicative of a region with slowing natural population growth. The difference between the NS and HS cycle scenarios shows the effect of migration, particularly for the 20 to 45 year age group. By 2036, the age structure of the population will be characterized as one of lower births and a larger proportion of the population over 70 years. The average population age is expected to increase from 44 years in 2016 to 50 by 2036, under the Medium HS model. If the historical trends continue, this area cannot maintain its 2016 population levels over the projection period.

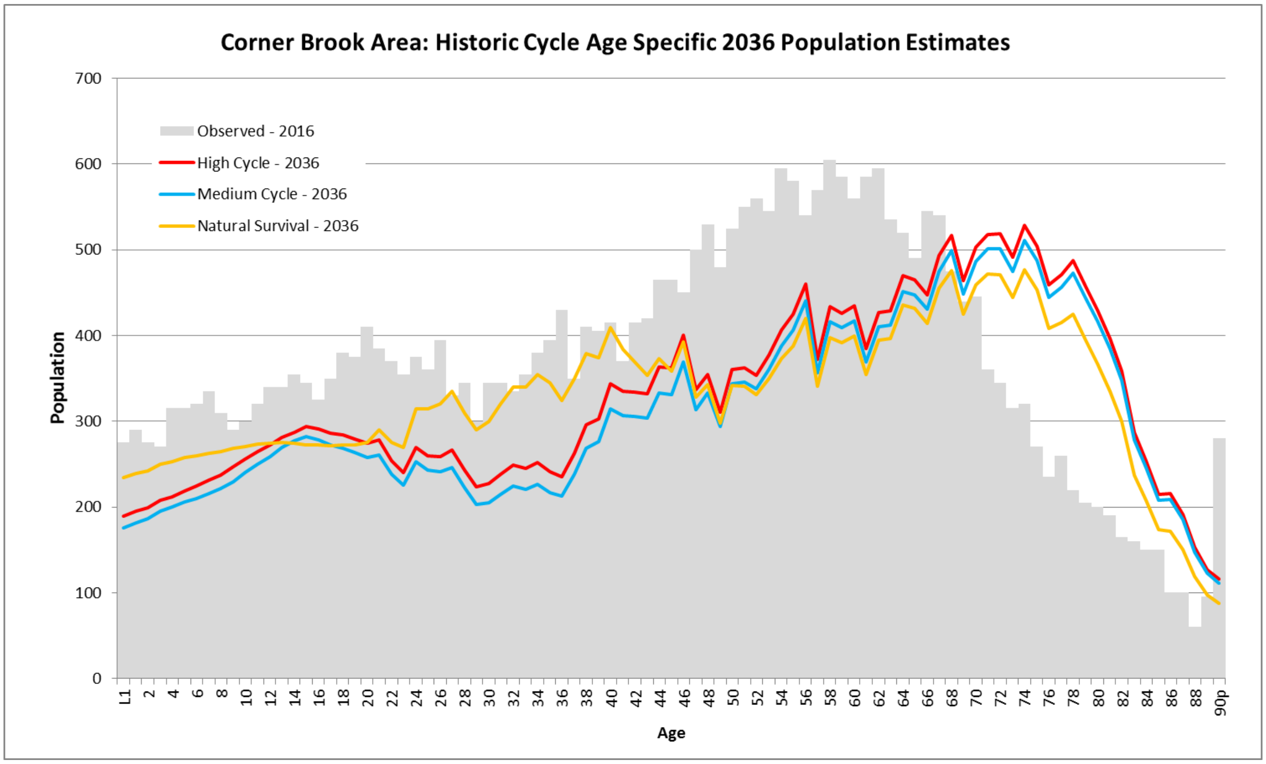


Figure 3.13: **Corner Brook Area: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.6 Stephenville – Crabbes River Area

The 2016 baseline population for the Stephenville – Crabbes River Area (Figure 3.14) is 18,665.

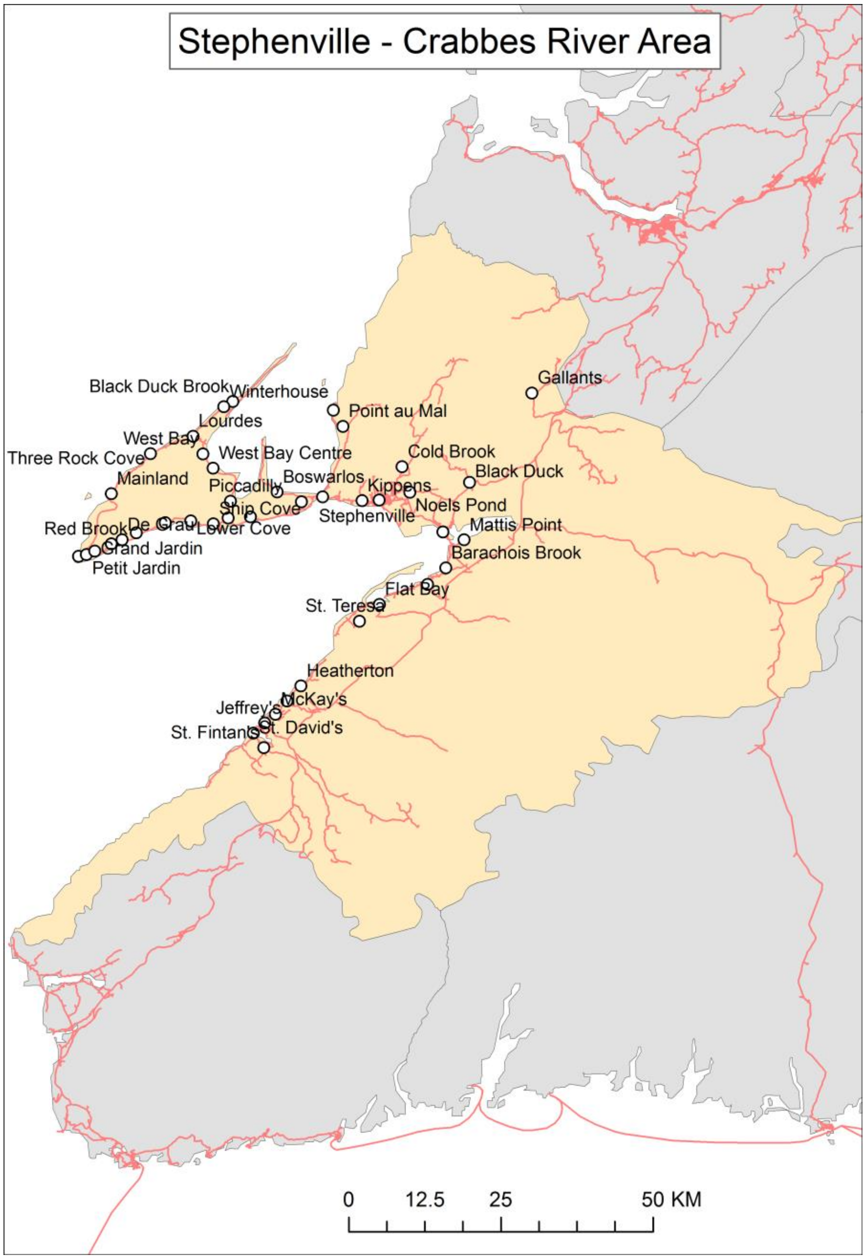


Figure 3.14: **Stephenville – Crabbes River Area.**

The NS model shows a continual population decline to 15,647 by 2036 (Table 3.5). This is a function of the age structure and prevailing birth and death rates that cannot maintain the population at the 2011 levels.

The Medium scenario HS model, which accounts for migration, projects that the population would decrease to 14,718 by 2036. The RS model estimates that the 2036 population could range from 16,513 for the Low (50%) to 17,349 for the High (100%) replacement scenarios (Table 3.5). All models predict long-term population decline. These outcomes indicate that even with a 100% replacement strategy, this area would not be able to maintain 2016 population levels.

Table 3.5: **Stephenville – Crabbes River Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	18665	18665	18665	18665	18665	18665
2017	18474	18500	18500	18510	18526	18549
2018	18362	18410	18410	18433	18465	18513
2019	18250	18319	18319	18358	18406	18479
2020	18135	18220	18220	18280	18344	18441
2021	18021	18118	18118	18203	18284	18406
2022	17907	17925	18013	18128	18225	18371
2023	17778	17712	17887	18038	18152	18323
2024	17648	17498	17759	17948	18079	18276
2025	17511	17272	17618	17851	17999	18221
2026	17363	17032	17461	17746	17911	18158
2027	17223	16882	17311	17648	17829	18102
2028	17067	16711	17139	17535	17734	18032
2029	16907	16535	16963	17421	17637	17960
2030	16744	16353	16780	17304	17537	17886
2031	16578	16165	16592	17184	17434	17808
2032	16400	15884	16387	17055	17322	17722
2033	16220	15602	16180	16926	17209	17635
2034	16039	15317	15967	16794	17095	17546
2035	15844	15017	15737	16653	16971	17447
2036	15647	14718	15507	16513	16847	17349

Note: *Table row values for* ***Year 2016*** *is the baseline population for the survival model estimates*

Figure 3.15 reinforces the concern regarding the capacity of the region to maintain its 2016 population level, even with retiree and other replacements. All three models show continual population decline over the forecast years. The NS model percent difference from 2016 is -16.17% by 2036, the Medium scenario HS projection, which includes a migration component, indicates a greater population decrease, -21.15%, by 2036. The Medium RS Model, with 70% replacement of the working population, also predicts negative growth at -9.74% by 2036.

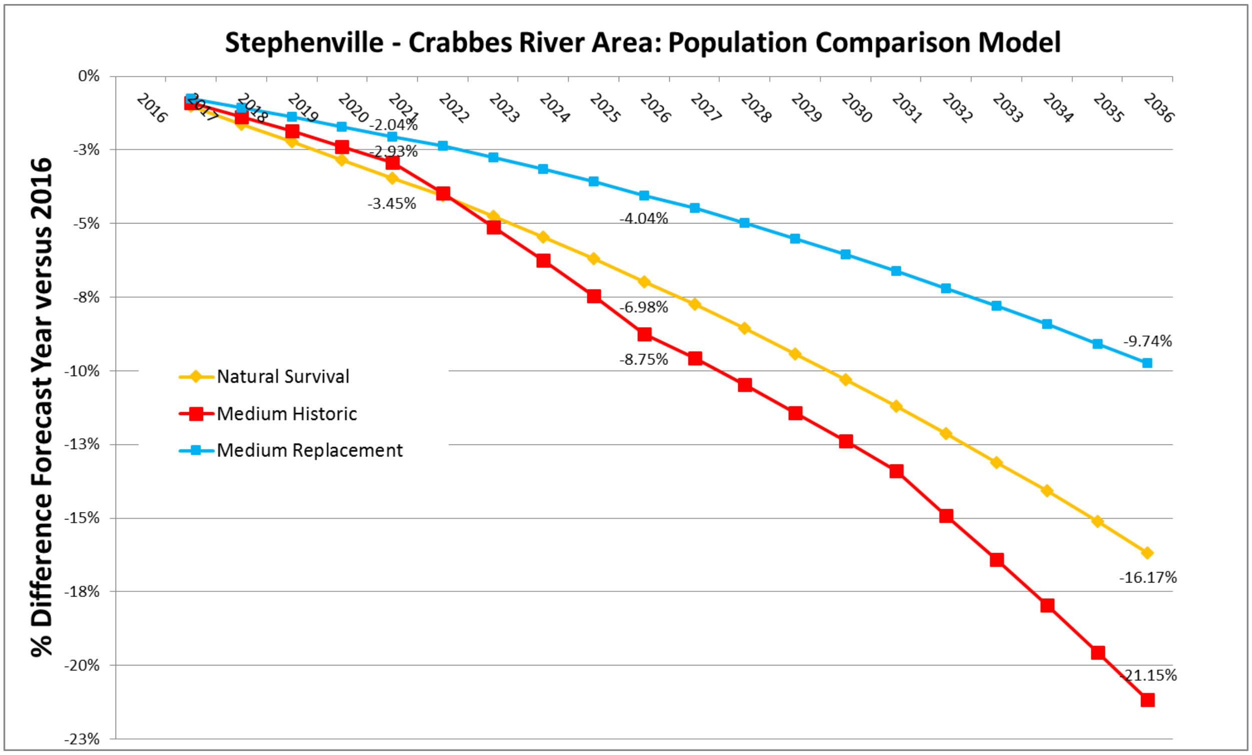


Figure 3.15: **Stephenville – Crabbes River Area: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

The 2016 and 2036 age structures are shown in Figure 3.16. If the HS trends persist and there is no replacement strategy, the population will decline and will also become dominated by cohorts 50 years of age and greater. Under the Medium HS model the estimated average age of the population increases from 46 years in 2016 to 52 years by 2036.

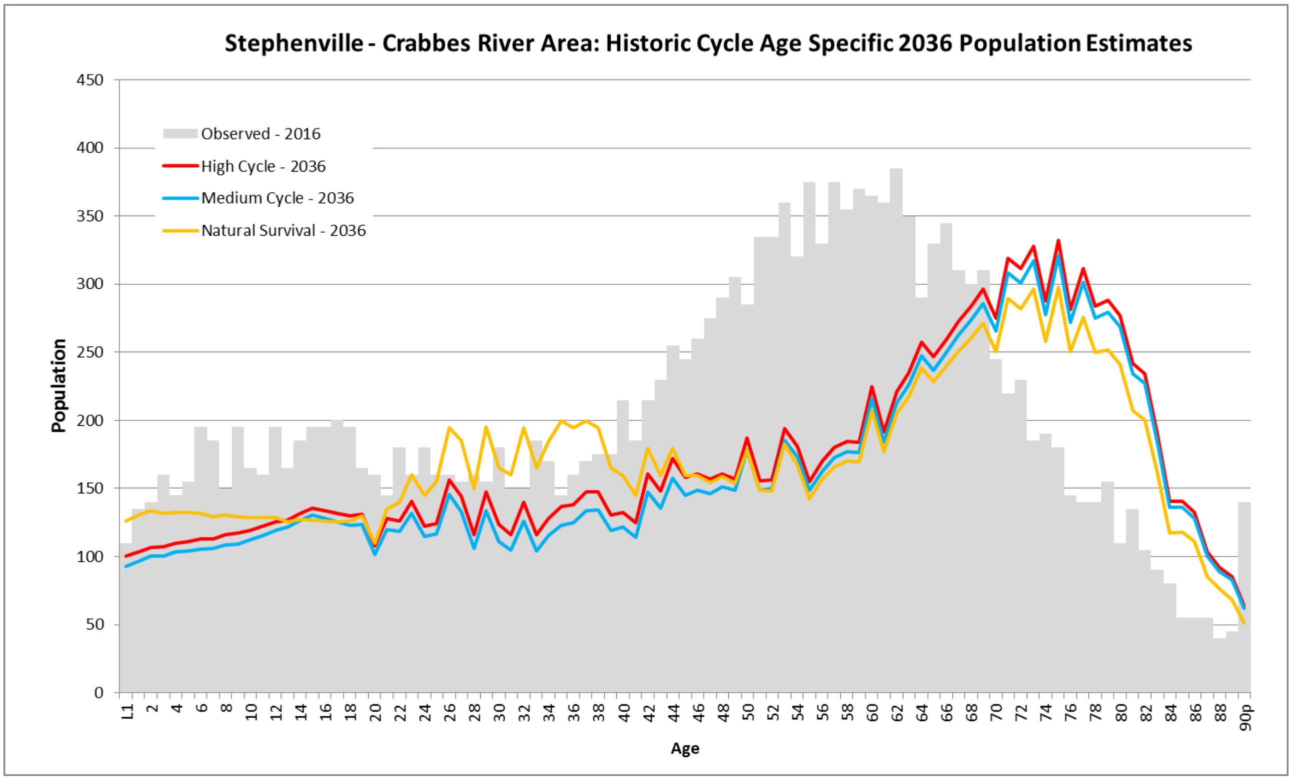


Figure 3.16: **Stephenville – Crabbes River Area: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.7 Port Aux Basques – Codroy Valley Area

The 2016 baseline population for the Port aux Basques – Codroy Valley Area (Figure 3.17) is 8,275.

Figure 3.17: **Port aux Basques – Codroy Valley Area.**

Like the Stephenville – Crabbes River Area, this area does not have the capacity to maintain its population over the long term. For 2036, the NS estimate is 6,649 and the HS Medium and High scenario estimates range from 5,630 to 5,893 (Table 3.6).

Under the RS model, not even a 100% replacement rate can keep the population at the 2016 level. If there are no replacement strategies, the RS model predicts that by 2036, the population will range from a low of 7,196 (Low scenario) to 7,625 (High scenario).

Table 3.6: **Port aux Basques – Codroy Valley Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	8275	8275	8275	8275	8275	8275
2017	8208	8179	8179	8225	8234	8246
2018	8146	8088	8088	8184	8201	8226
2019	8077	7987	7987	8137	8162	8200
2020	8018	7895	7895	8099	8133	8184
2021	7947	7792	7792	8052	8095	8159
2022	7873	7652	7685	8004	8055	8131
2023	7806	7518	7584	7961	8020	8110
2024	7734	7379	7477	7913	7982	8084
2025	7661	7239	7367	7865	7942	8058
2026	7587	7096	7254	7816	7902	8031
2027	7510	6981	7137	7765	7859	8001
2028	7429	6862	7015	7710	7813	7968
2029	7340	6734	6885	7650	7762	7929
2030	7253	6606	6755	7592	7712	7892
2031	7163	6475	6621	7532	7661	7854
2032	7066	6309	6482	7468	7606	7812
2033	6964	6140	6337	7401	7547	7767
2034	6863	5971	6192	7335	7489	7721
2035	6757	5800	6043	7266	7429	7673
2036	6649	5630	5893	7196	7367	7625

Note: Table row values for **Year 2016** is the baseline population for the survival model estimates

The percent change trends presented in Figure 3.18 also confirm that the inherent characteristics of the population cannot maintain the 2016 population and population decline over the projection period is expected. By 2036, the NS model predicts a population decline of 19.65% while the Medium HR model predicts a 31.96% decline.

The Medium RS model demonstrates that 70% retiree replacement is not enough to maintain population levels. This model predicts a 10.97% decline by 2036.

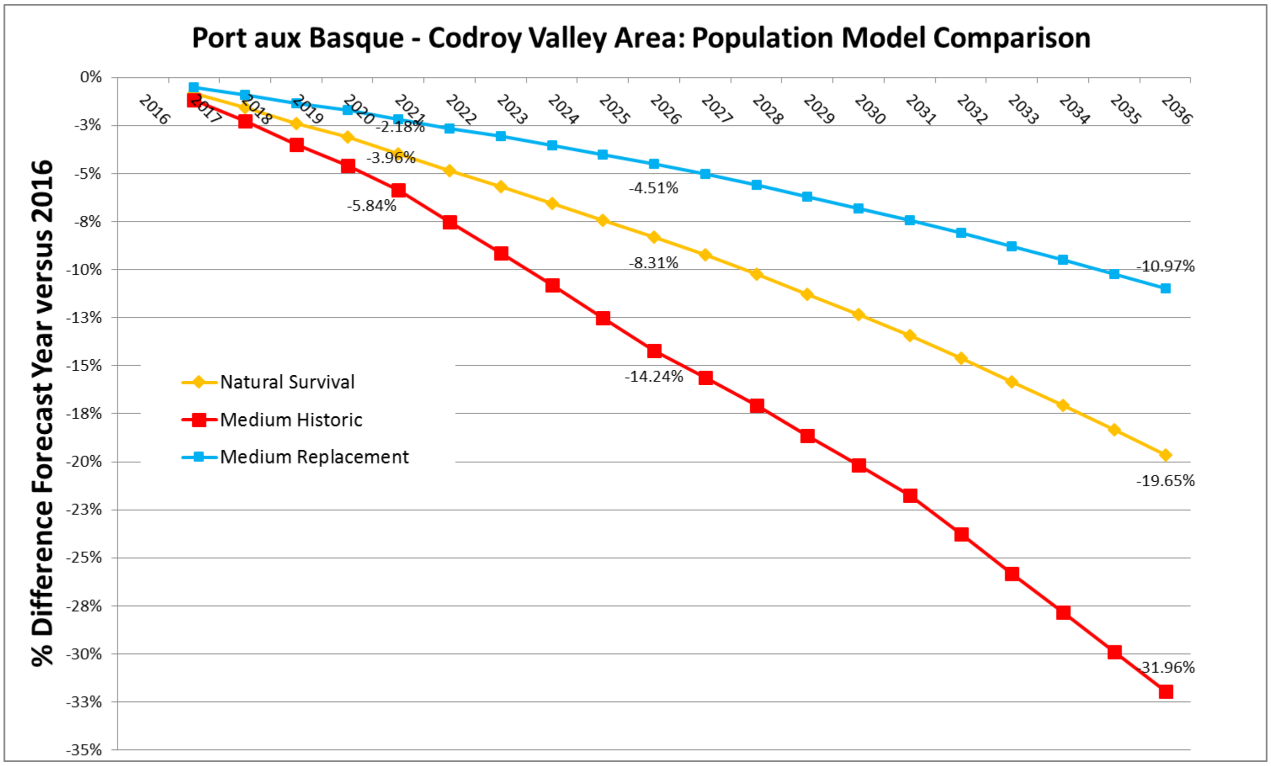


Figure 3.18: **Port aux Basques – Codroy Valley Area: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

The age structure of the region's population in 2016 shows that that the majority of the population is between 40 and 75 (Figure 3.19). By 2036 there will be fewer in all cohorts under 70, and particularly those from 33 to 70. With more people in the 70 plus age categories the average age of the population would increase from 48 in 2016 to 56 years in 2036.

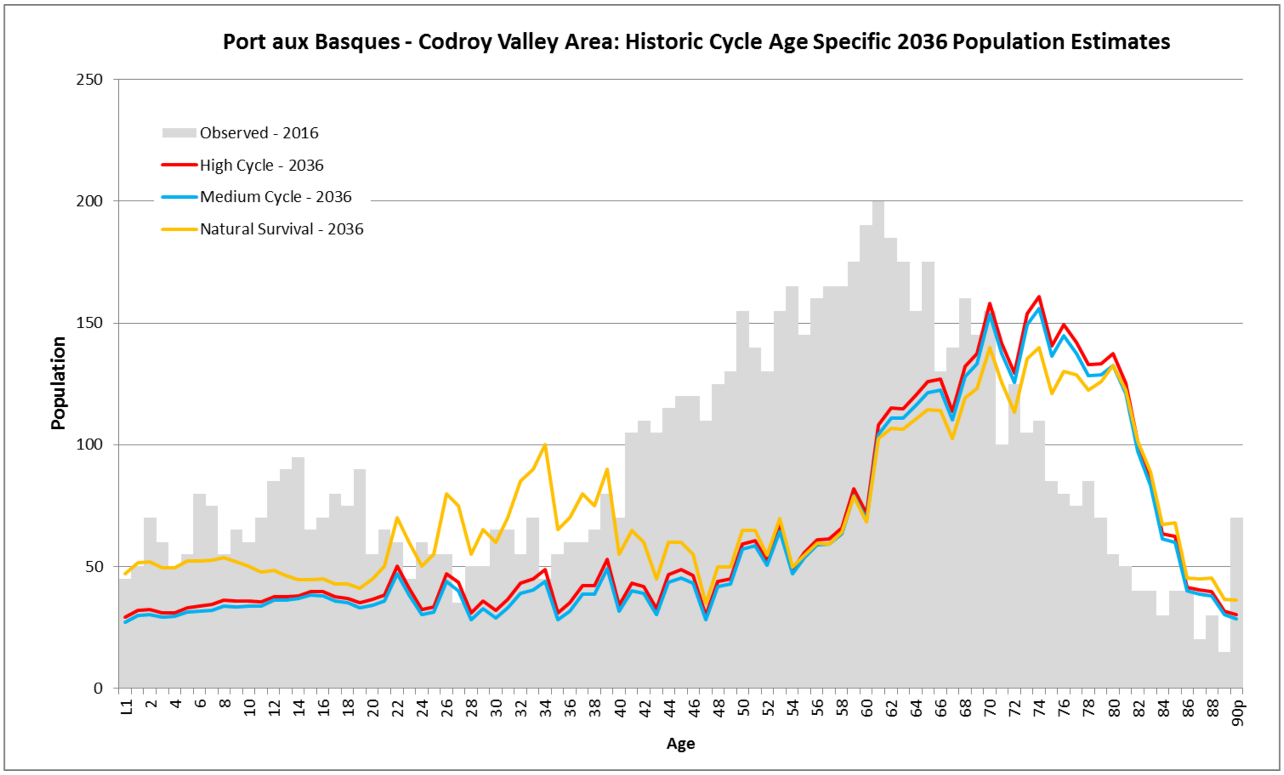


Figure 3.19: **Port aux Basques – Codroy Valley Area: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.8 White Bay – Baie Verte Area

The 2016 baseline population for the White Bay – Baie Verte Area (Figure 3.20) is 5,350.

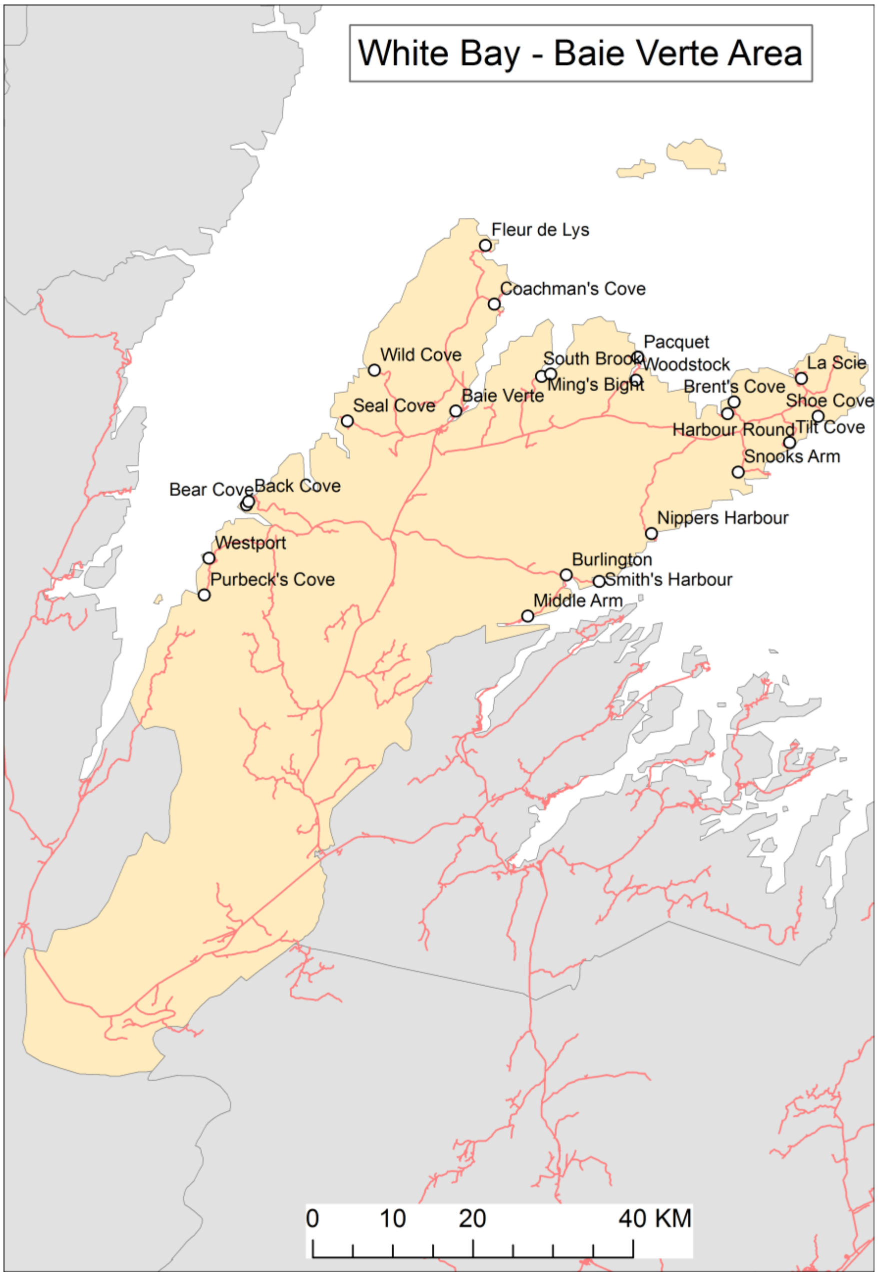


Figure 3.20: **White Bay – Baie Verte Area.**

The NS model for the White Bay – Baie Verte Area estimates a population of 4,637 by 2036, while the Medium HS model estimates a population of 3,546 - a decline in both cases (Table 3.7). For the same period, the RS model predicts population changes under the Low and High scenarios to 5,045 and 5,320 respectively.

Table 3.7: **White Bay – Baie Verte Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	5350	5350	5350	5350	5350	5350
2017	5347	5294	5294	5357	5362	5370
2018	5314	5211	5211	5338	5349	5364
2019	5294	5142	5142	5332	5348	5372
2020	5273	5074	5074	5327	5348	5380
2021	5249	5004	5004	5319	5346	5386
2022	5224	4910	4932	5311	5343	5392
2023	5199	4817	4860	5303	5341	5398
2024	5173	4722	4785	5295	5338	5403
2025	5140	4623	4706	5282	5331	5405
2026	5103	4523	4624	5268	5322	5404
2027	5066	4439	4539	5252	5312	5403
2028	5029	4356	4454	5236	5301	5400
2029	4988	4270	4366	5217	5288	5395
2030	4946	4185	4279	5198	5275	5390
2031	4899	4096	4188	5176	5259	5382
2032	4853	3989	4097	5154	5242	5374
2033	4802	3879	4003	5129	5222	5362
2034	4753	3770	3908	5103	5203	5351
2035	4697	3658	3810	5075	5180	5336
2036	4637	3546	3709	5045	5155	5320

Note: Table row values for **Year 2016** is the baseline population for the survival model estimates

Figure 3.21 again illustrates the potential significance of out-migration on the projections. Under the NS model, without a migration component, the population is projected to decline by 13.33% by 2036, including a migration component it is expected decline by 33.72%.

Under the RS model assumptions the Medium scenario would see a decline of 3.64%, but even a 100% replacement would see a 0.56% decline by 2036.

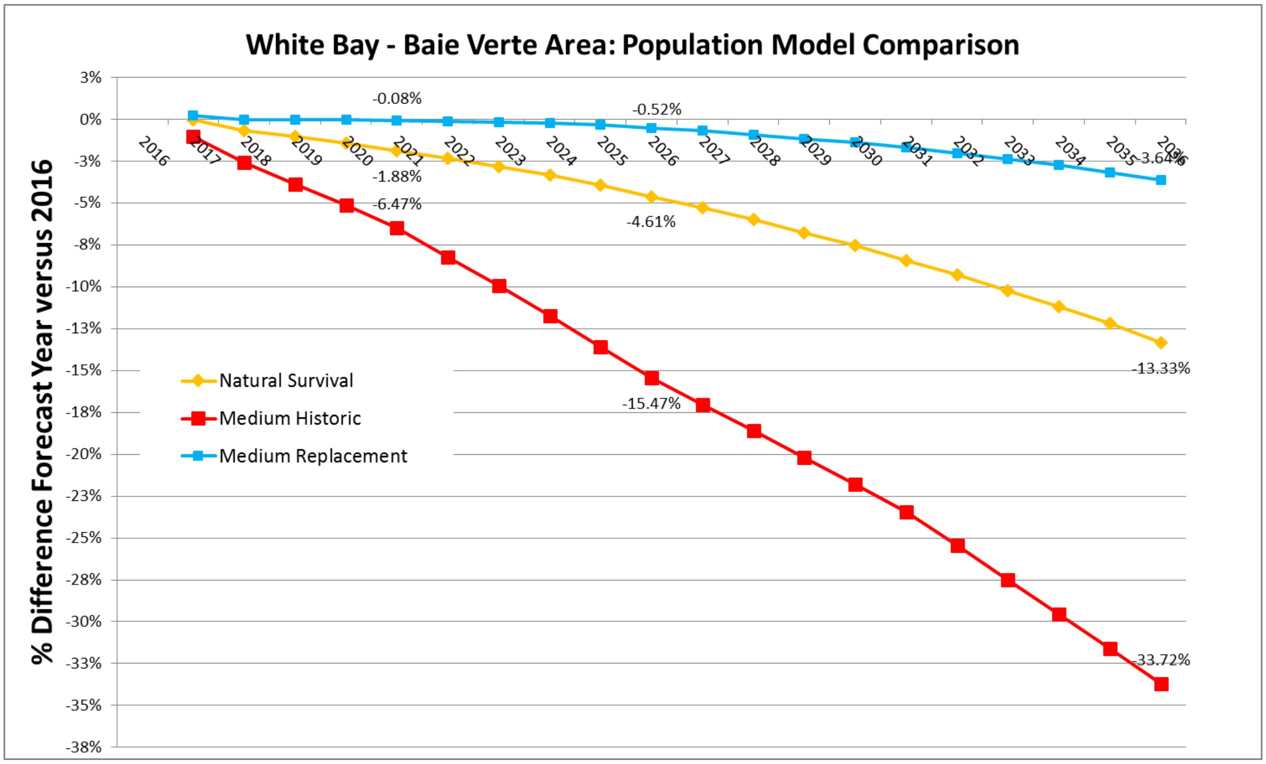


Figure 3.21: **White Bay – Baie Verte Area: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

The 2016 and projected 2036 age structures are presented in Figure 3.22. As with several other regions described earlier, losses are expected in all cohorts up to age 70. Thereafter there are expected to be more people in the 70+ age categories. In this region the average age increases from 47 years in 2016 to 56 years by 2036. If historical trends continue, this area cannot maintain its 2016 population levels over the projection period.

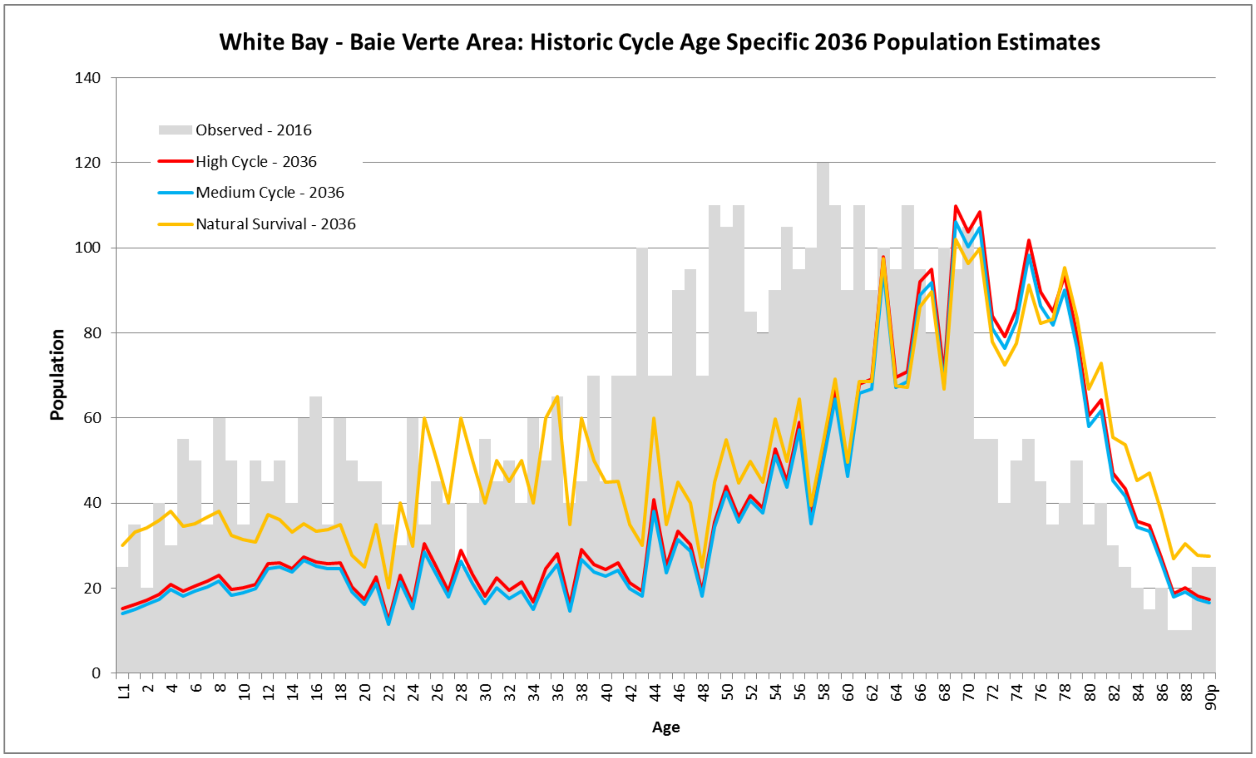


Figure 3.22: **White Bay – Baie Verte Area: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.9 Springdale - Triton Area

The 2016 baseline population for the Springdale - Triton Area (Figure 3.23) is 7,850.

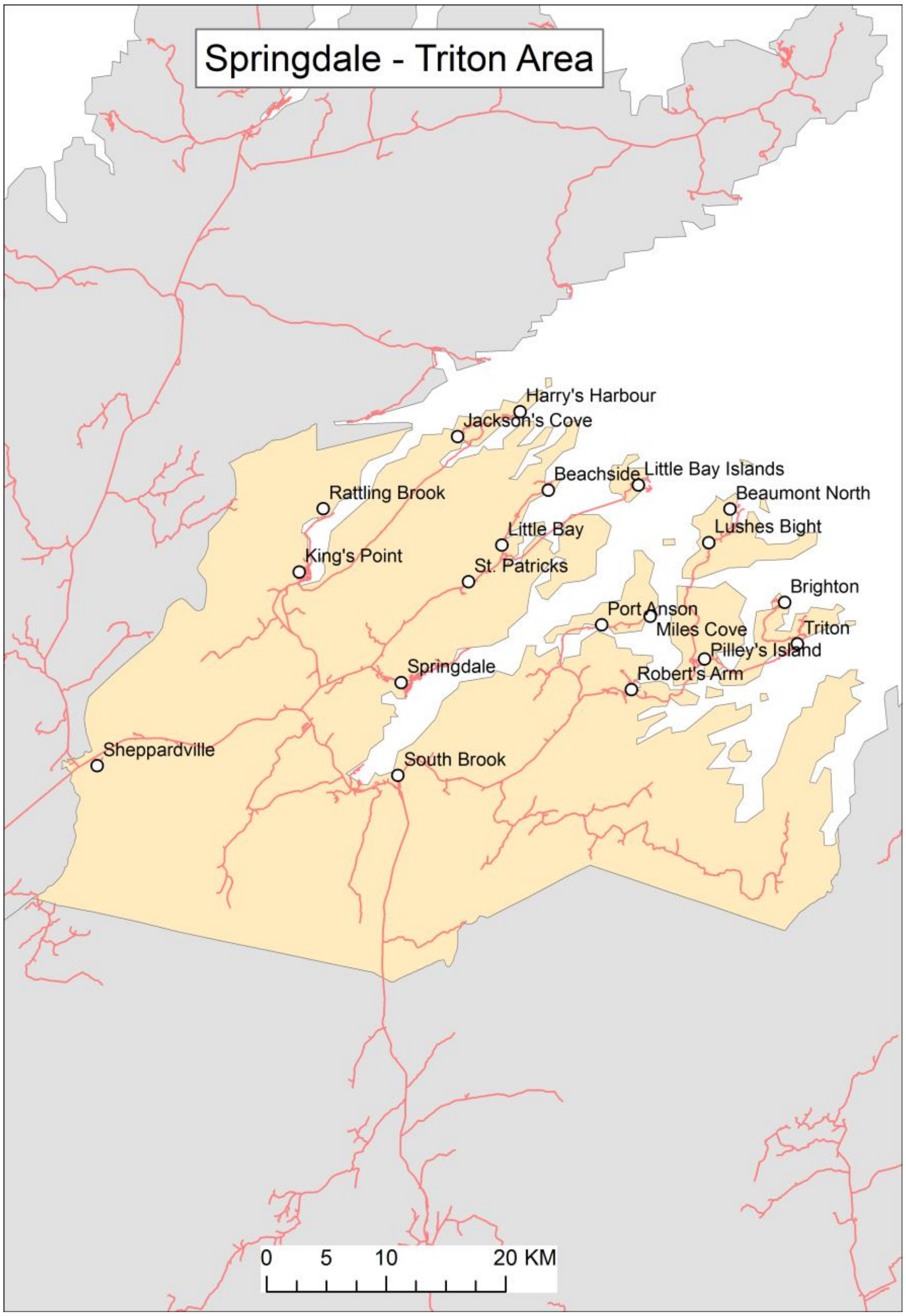


Figure 3.23: **Springdale - Triton Area.**

Table 3.8 shows predicted population decreases for both the NS and HS Models. The NS model estimates a population of 6,455 by 2036, while the Medium scenario HS model estimates a population of 4,632.

Each of the RS models also project population declines over the 2016-2036 period indicating that even with a 100% replacement the population would still be expected to decrease.

Table 3.8: **Springdale – Triton Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	7850	7850	7850	7850	7850	7850
2017	7788	7690	7690	7806	7814	7825
2018	7738	7544	7544	7778	7793	7817
2019	7682	7394	7394	7748	7771	7806
2020	7624	7245	7245	7719	7751	7798
2021	7574	7105	7105	7700	7739	7798
2022	7531	6938	6972	7686	7734	7805
2023	7483	6769	6837	7671	7727	7810
2024	7419	6589	6688	7646	7710	7805
2025	7355	6412	6541	7622	7694	7801
2026	7288	6236	6393	7599	7678	7798
2027	7220	6092	6245	7574	7662	7794
2028	7154	5951	6100	7551	7647	7792
2029	7085	5810	5956	7529	7633	7790
2030	7017	5670	5812	7507	7620	7789
2031	6930	5517	5657	7476	7597	7779
2032	6848	5342	5505	7450	7579	7773
2033	6748	5160	5345	7416	7553	7760
2034	6648	4981	5186	7383	7529	7747
2035	6551	4805	5029	7351	7505	7736
2036	6455	4632	4874	7321	7483	7727

Note: Table row values for **Year 2016** is the baseline population for the survival model estimates

As Figure 3.24 indicates the NS model projection indicates a 17.77% decrease in population by 2036, but if migration is included, the Medium scenario HS model results suggest that this will be closer to 41%. The Medium scenario RS model suggests that a 70% replacement would reduce population decline to 4.68%, but, as noted above, even a 100% replacement would not see the population stabilized completely.

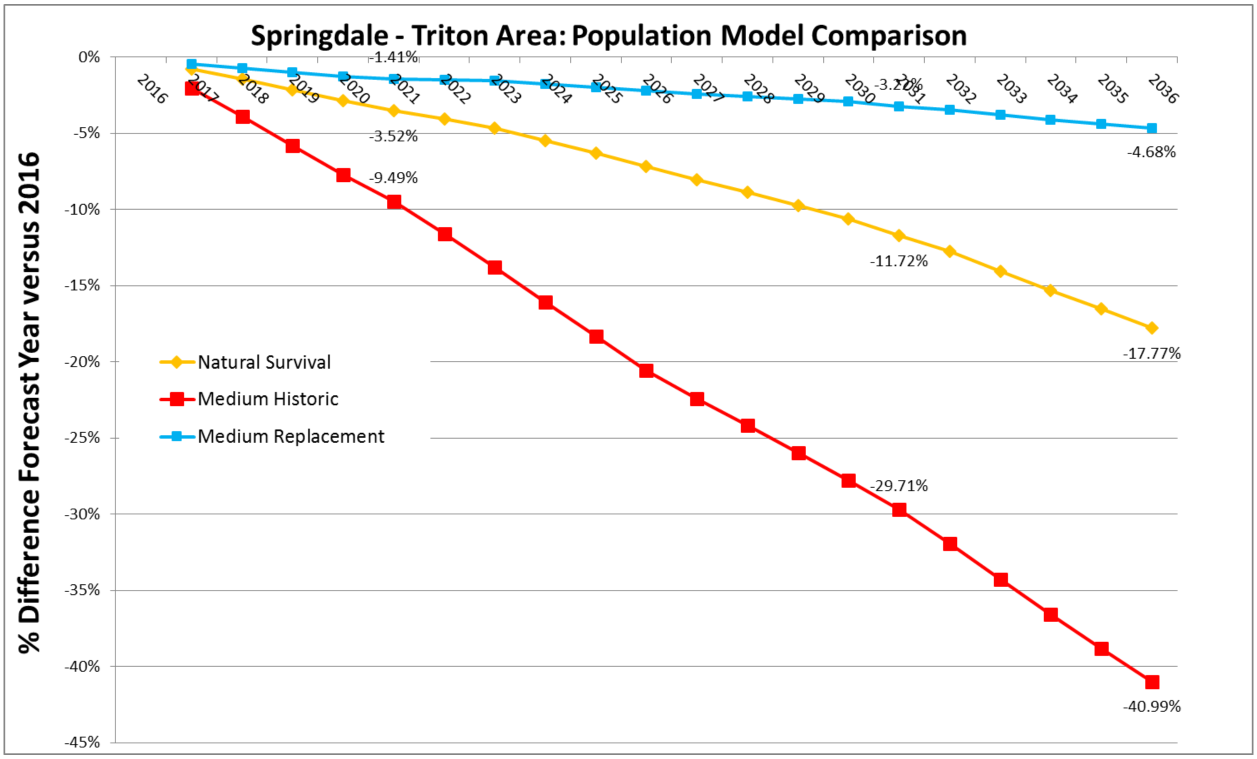


Figure 3.24: **Springdale - Triton Area: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

The 2016 age structure presented in Figure 3.25 shows a bias towards the older age cohorts. This population has shifted by 2036 to an age structure associated with lower birth rates and a greater proportion of the population over the age of 60. The average population age is projected to increase from 48 years in 2011 to 55 by 2036.

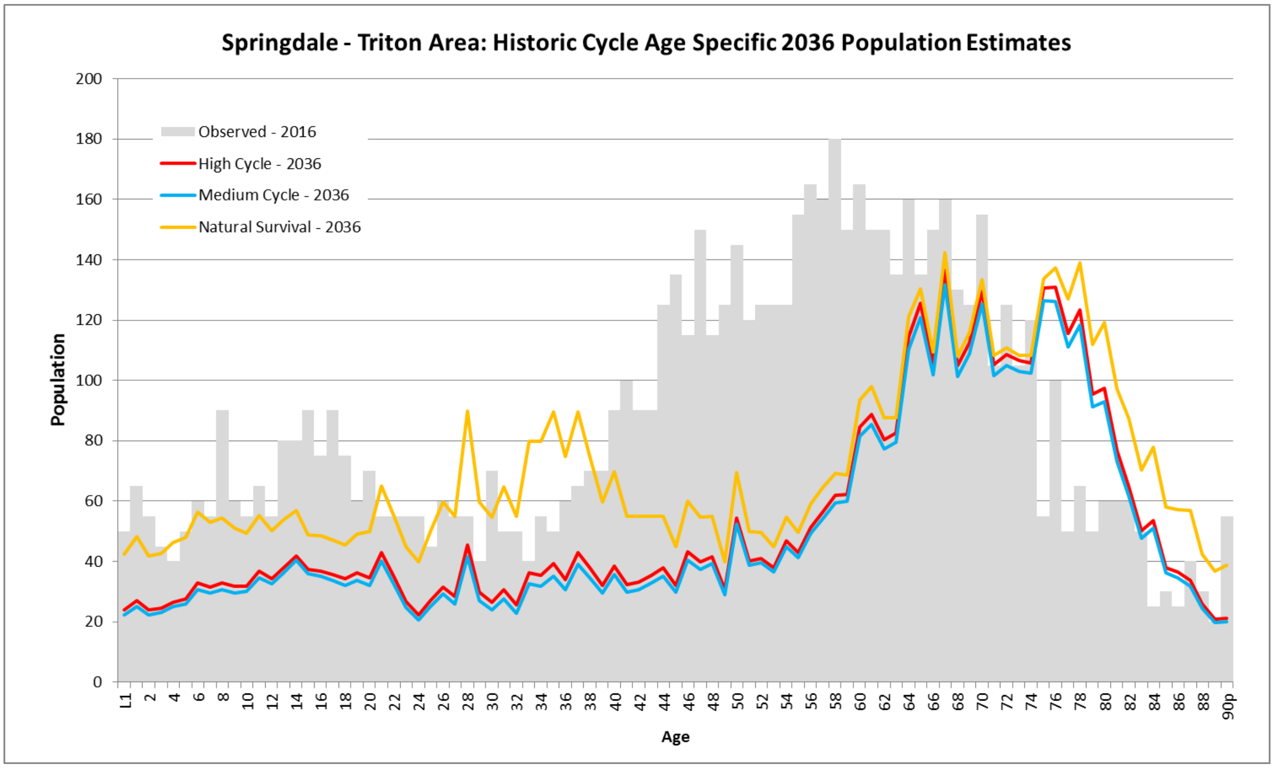


Figure 3.25: **Springdale - Triton Area: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.10 Grand Falls-Windsor – Norris Arm Area

The 2016 baseline population for the Grand Falls-Windsor – Norris Arm Area (Figure 3.26) is 26,755.

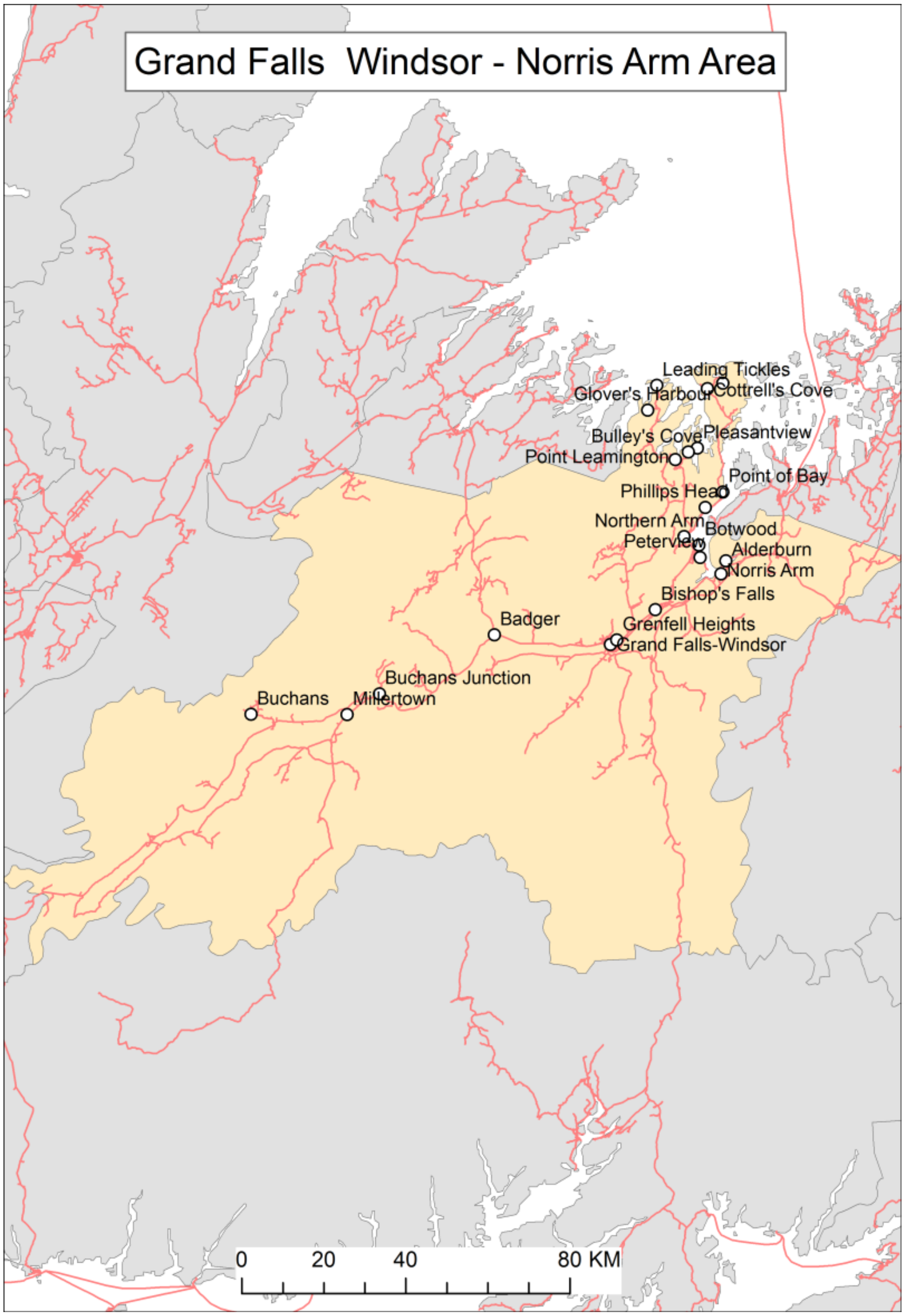


Figure 3.26: **Grand Falls-Windsor – Norris Arm Area.**

The Grand Falls-Windsor – Norris Arm Area is projected to decline to over time according to all three models. Table 3.9 shows that the NS model estimates a population of 22,278 by 2036 and the Medium and High HS model scenarios estimate populations of 21,048 and 22,182 respectively. The RS model shows the term impacts of low birth rates and out-migration with population declines by 2036 for all scenarios. Even with 100% replacement of those leaving the labour force the population would decline to 24,663 by the end of the projection period.

Table 3.9: **Grand Falls-Windsor – Norris Arm Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	26755	26755	26755	26755	26755	26755
2017	26498	26544	26544	26545	26567	26600
2018	26345	26434	26434	26442	26486	26552
2019	26185	26309	26309	26331	26397	26497
2020	26010	26167	26167	26209	26298	26432
2021	25820	26000	26000	26072	26184	26352
2022	25640	25714	25841	25947	26082	26284
2023	25433	25397	25648	25798	25956	26193
2024	25232	25080	25454	25654	25835	26107
2025	25027	24755	25251	25508	25712	26019
2026	24818	24421	25037	25357	25585	25927
2027	24596	24188	24803	25196	25447	25823
2028	24371	23948	24562	25032	25306	25718
2029	24134	23690	24304	24858	25156	25603
2030	23881	23409	24022	24672	24993	25476
2031	23633	23129	23741	24489	24834	25352
2032	23380	22731	23453	24303	24672	25225
2033	23111	22314	23143	24106	24498	25087
2034	22842	21900	22834	23911	24326	24950
2035	22564	21477	22512	23710	24150	24809
2036	22278	21048	22182	23506	23969	24663

Note: Table row values for **Year 2016** is the baseline population for the survival model estimates

The inability of this area to maintain its population is illustrated in Figure 3.27 where all models exhibit continual population decline for all yearly predictions. Without any changes to natural survival or migration parameters the projection under the Medium HS model indicates a decline of 21.33% over the projection period.

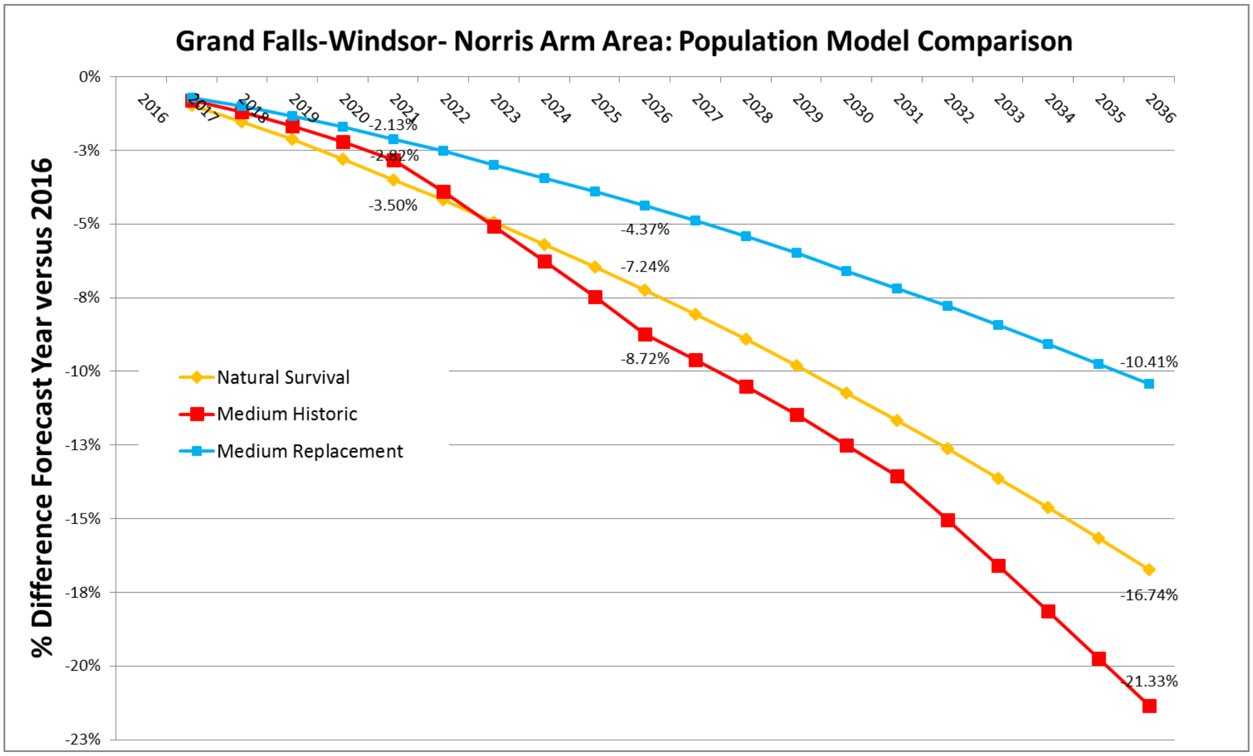


Figure 3.27: **Grand Falls-Windsor – Norris Arm Area: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

The 2016 and 2036 age structures are shown in Figure 3.28. If current trends persist, the population will decline and will also become dominated by age cohorts 50 years and greater. The estimated average age of the population increases from 46 years in 2016 to 51 years by 2036.

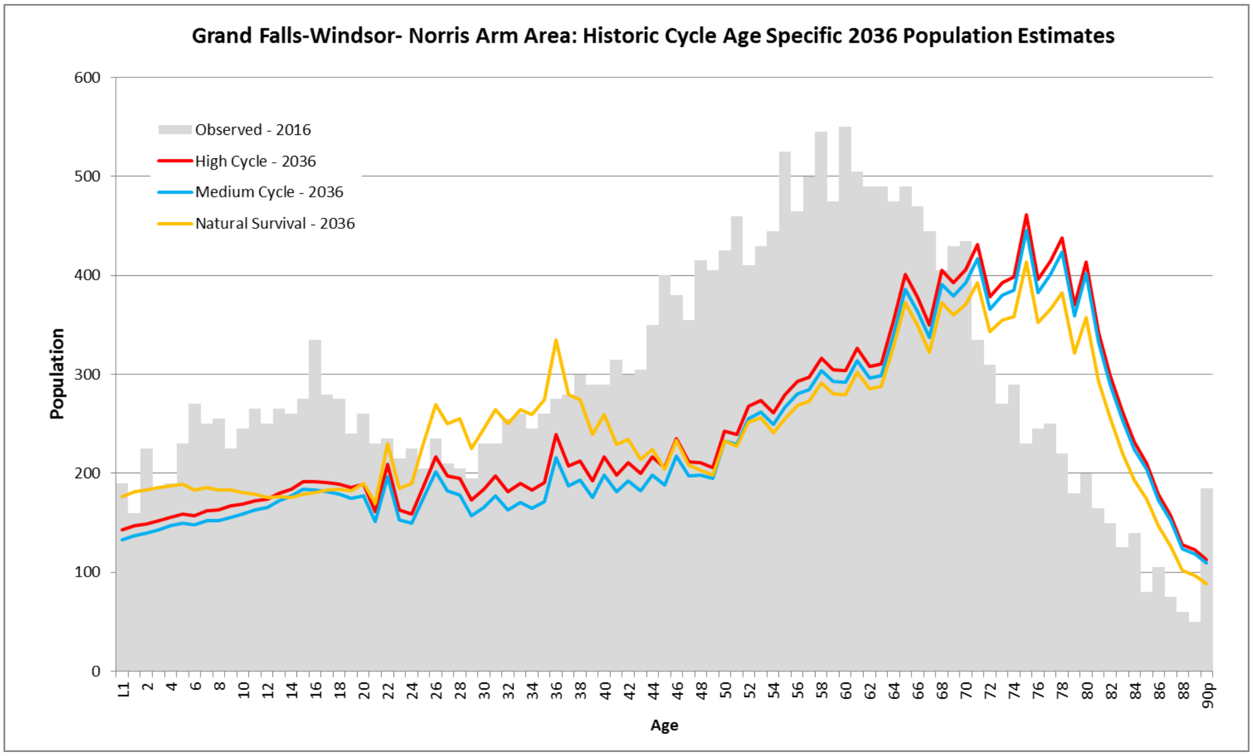


Figure 3.28: **Grand Falls-Windsor – Norris Arm Area: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.11 South Coast Area

The 2016 baseline population for the South Coast Area (Figure 3.29) is 9,050.

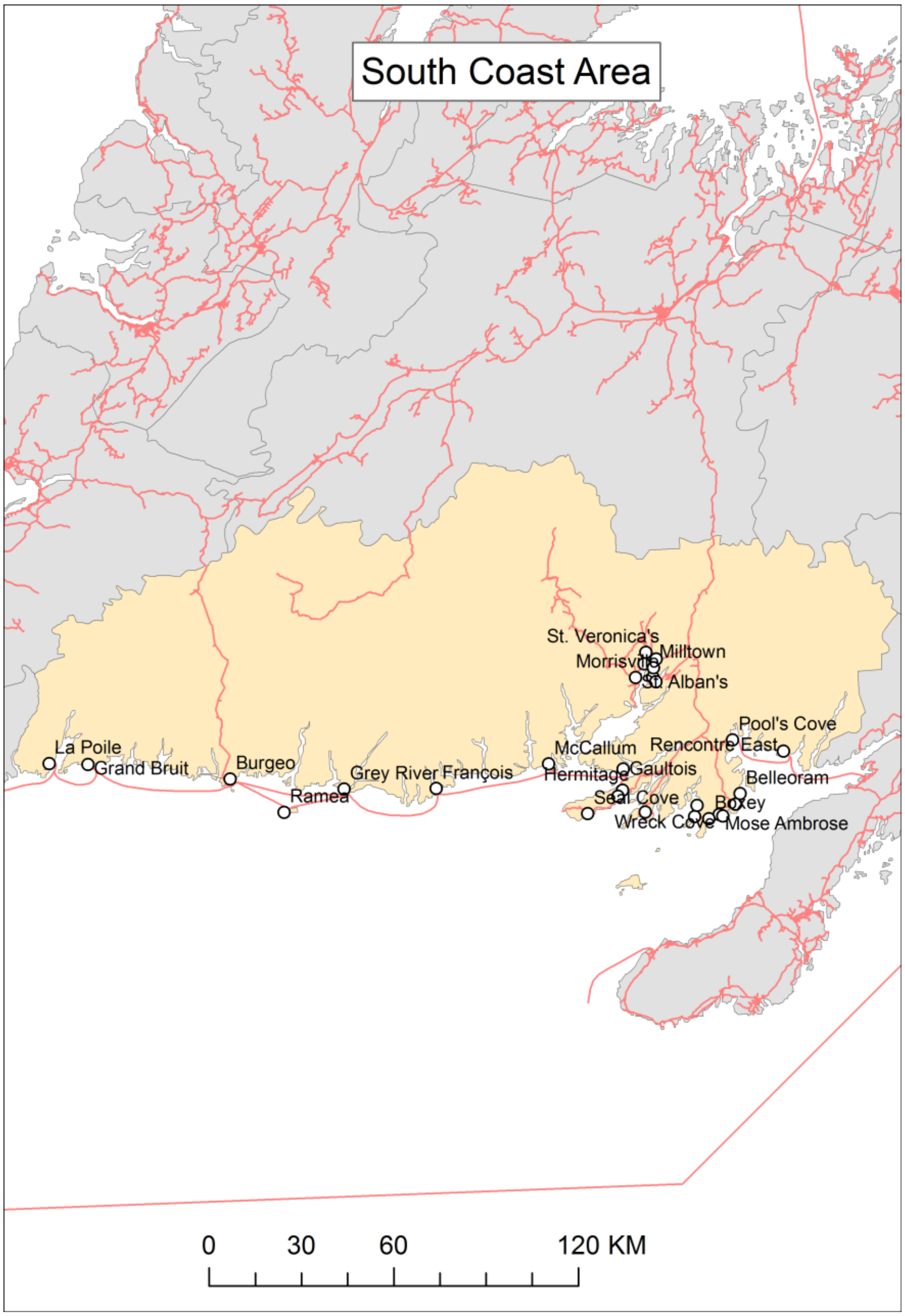


Figure 3.29: **South Coast Area.**

The NS model for the South Coast Area estimates a population of 7,755 by 2036, while the Medium and High HS models estimate population declines to 6,389 and 6,686 respectively (Table 3.10). For the same period, the RS model predicts population decreases in the Low and High scenarios to 8,417 and 8,959, respectively.

Table 3.10: **South Coast Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	9050	9050	9050	9050	9050	9050
2017	9112	9057	9057	9126	9137	9152
2018	9069	8961	8961	9109	9130	9161
2019	9023	8865	8865	9091	9122	9170
2020	8972	8765	8765	9069	9111	9175
2021	8918	8660	8660	9044	9098	9178
2022	8864	8519	8557	9021	9085	9182
2023	8814	8379	8454	9000	9075	9188
2024	8759	8234	8345	8975	9061	9190
2025	8699	8086	8231	8946	9043	9189
2026	8636	7935	8114	8914	9022	9184
2027	8576	7820	7997	8883	9002	9181
2028	8508	7697	7872	8846	8976	9171
2029	8428	7565	7737	8802	8943	9154
2030	8346	7430	7600	8756	8908	9136
2031	8262	7293	7460	8708	8871	9115
2032	8169	7116	7313	8655	8829	9090
2033	8075	6940	7164	8602	8786	9063
2034	7975	6759	7010	8543	8739	9032
2035	7873	6579	6853	8484	8690	9000
2036	7755	6389	6686	8417	8634	8959

Note: Table row values for **Year 2016** is the baseline population for the survival model estimates

As Figure 3.30 indicates, natural survival rates (NS model) are not sufficient to maintain current population levels, and when current migration trends are included the Medium HS model predicts a decrease in population of 29.41% by 2036. The Medium scenario RS model results illustrated indicate that losses could be reduced to 4.60%, but even under the High, 100% replacement scenario a decrease is still projected.

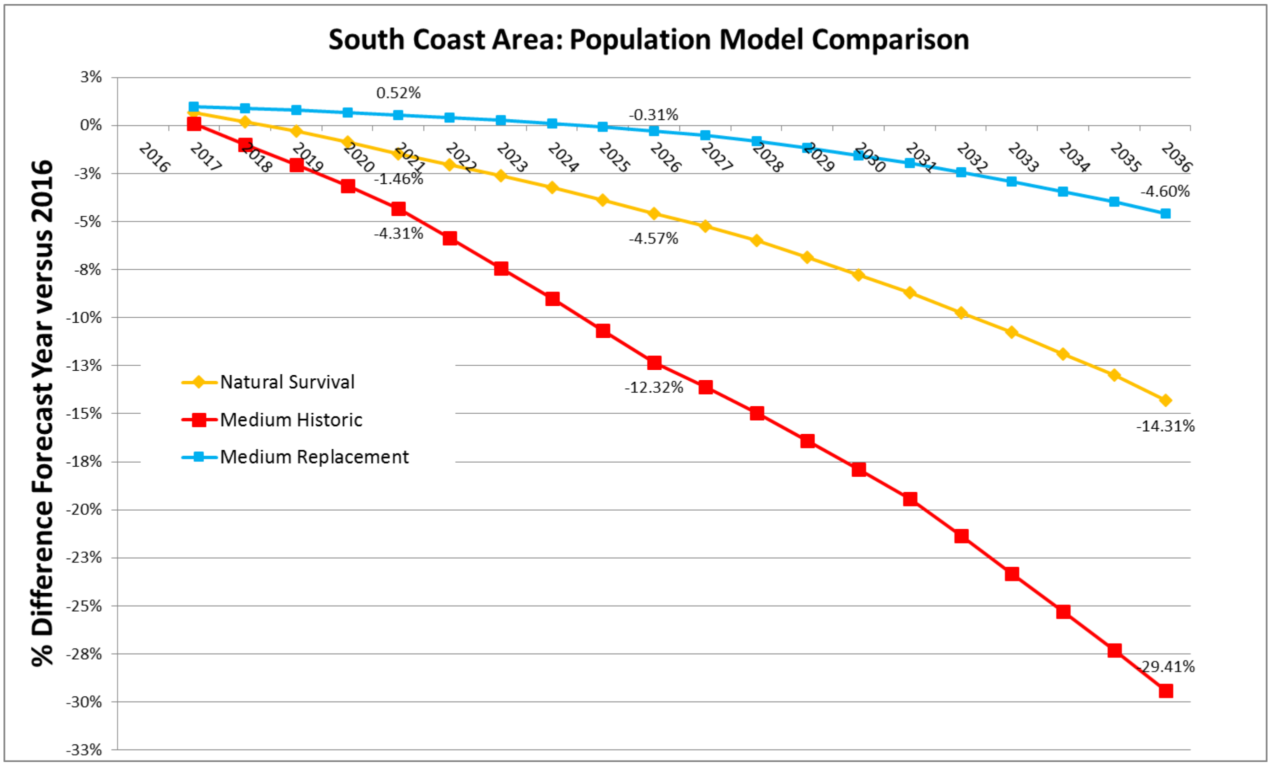


Figure 3.30: **South Coast Area: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

The 2016 and projected 2036 age structures are presented in Figure 3.31. Out-migration in particular is expected to have a significant effect among all cohorts less than 50 years of age. As with many other regions, projected losses of those in the working age groups are significant, together with an increase in those over 65. The average population age shifts from 47 years in 2016 to 57 by 2036.

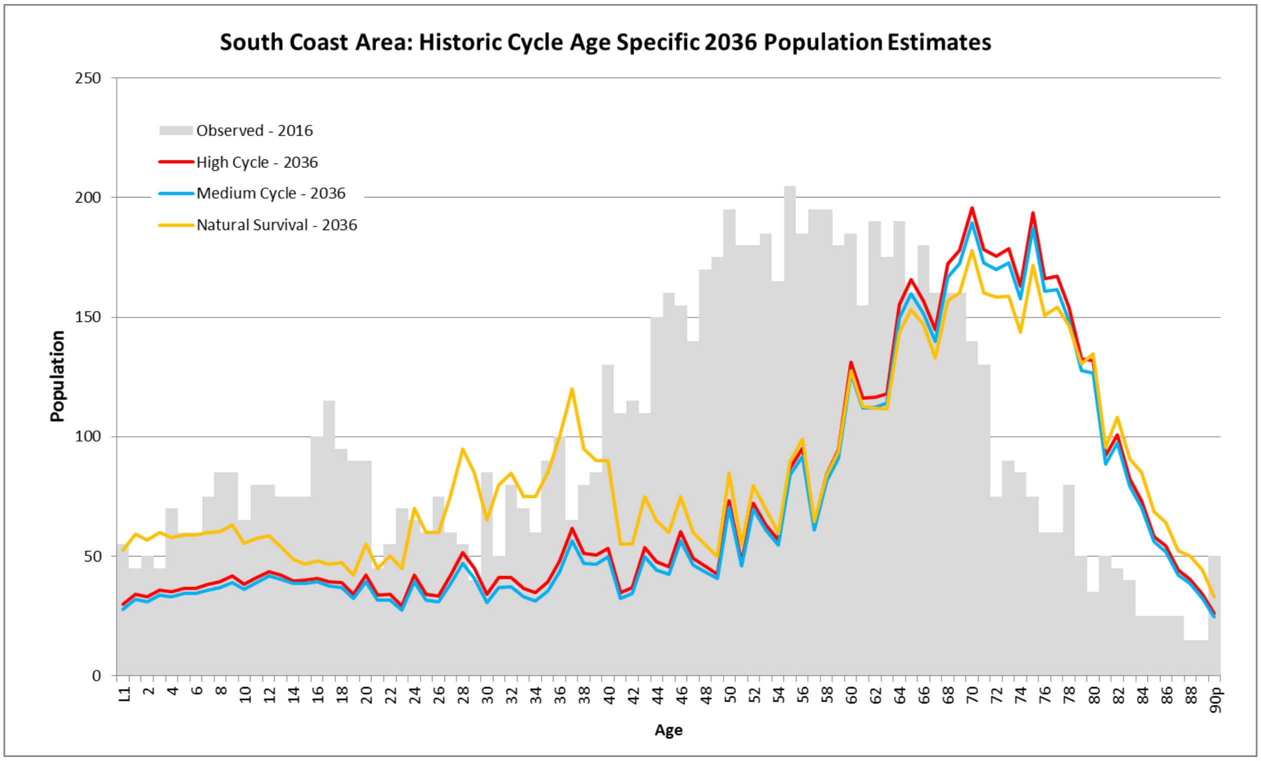


Figure 3.31: **South Coast Area: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.12 Lewisporte – Twillingate Area

The 2016 baseline population for the Lewisporte - Twillingate Area (Figure 3.32) is 13,065.

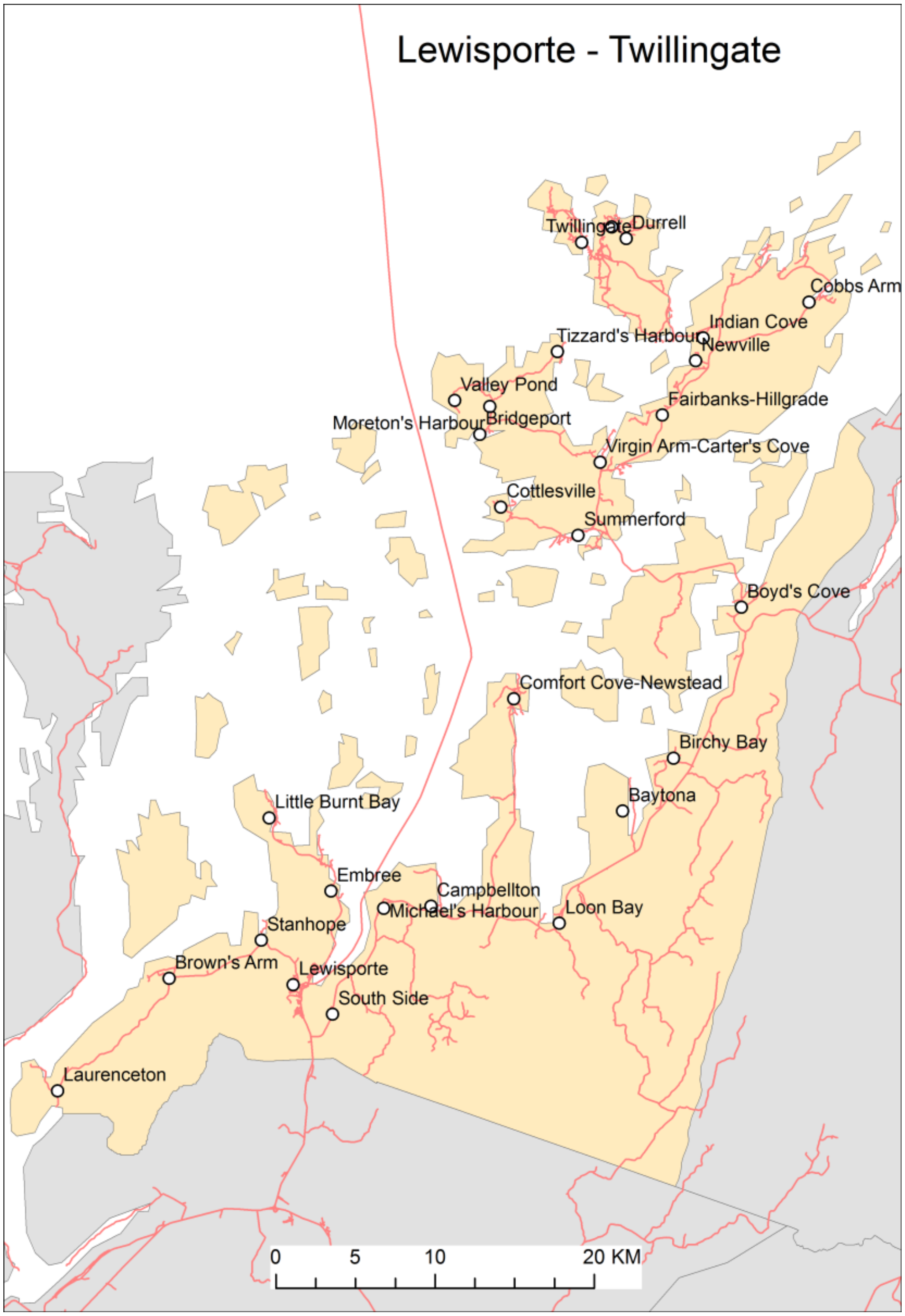


Figure 3.32: **Lewisporte - Twillingate Area.**

The NS model suggests that the population would decrease to 10,228 by 2036 (Table 3.11). This predicted population decline is magnified when migration effects are included. The HS outcomes for Medium and High migration trends both indicate that if the migration cycles repeat in the future, and there is no population replacement policy, then the population would decrease to 8,759 under the Medium scenario and 9,165 under the High scenario.

The results for the RS models show similar decline outcomes, the Medium RS scenario (70% replacement), for example, indicates the population will decrease to 11,338, by 2036 (Table 3.11).

Table 3.11: **Lewisporte - Twillingate Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	13065	13065	13065	13065	13065	13065
2017	12918	12880	12880	12945	12958	12977
2018	12801	12725	12725	12859	12885	12924
2019	12685	12571	12571	12776	12815	12873
2020	12560	12407	12407	12686	12738	12816
2021	12440	12246	12246	12602	12667	12765
2022	12328	12036	12089	12524	12603	12721
2023	12211	11819	11922	12443	12535	12673
2024	12086	11592	11745	12355	12460	12617
2025	11952	11356	11556	12260	12378	12555
2026	11824	11124	11370	12170	12301	12498
2027	11689	10934	11176	12075	12219	12436
2028	11548	10734	10973	11975	12133	12369
2029	11400	10527	10762	11870	12041	12297
2030	11244	10315	10546	11761	11945	12222
2031	11088	10099	10327	11652	11850	12146
2032	10927	9835	10103	11542	11753	12068
2033	10758	9567	9873	11427	11651	11986
2034	10585	9298	9639	11311	11548	11903
2035	10404	9024	9399	11191	11441	11815
2036	10228	8759	9165	11075	11338	11731

Note: Table row values for **Year 2016** is the baseline population for all model estimates

Figure 3.33 indicates that all models predict negative changes from the 2016 baseline – specifically that the population decreases by 21.72% under the NS model by 2036, the Medium scenario HS model by 32.96% and the Medium scenario RS model by 13.22%

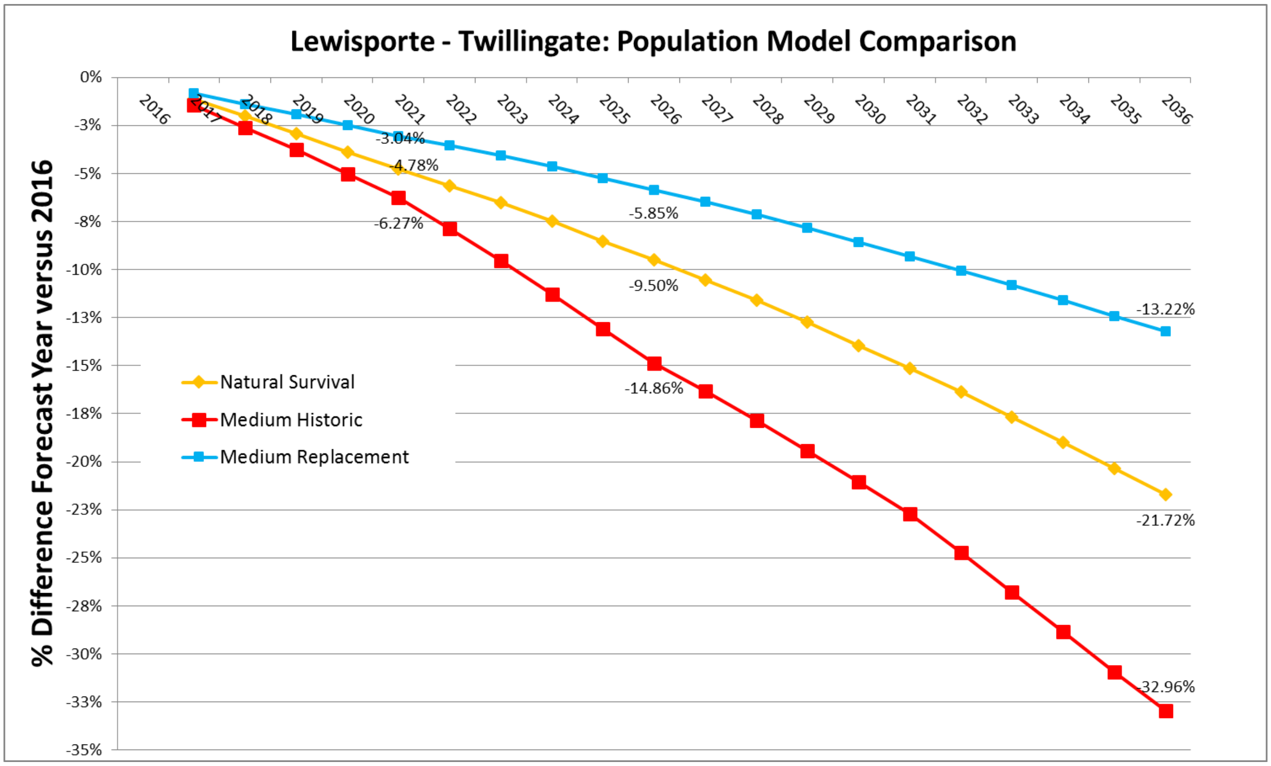


Figure 3.33: **Lewisporte - Twillingate Area: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

Figure 3.34 presents the region's projected population age structure for 2036. The 2016 baseline data are presented together with the NS and the Medium and High HS projections. As illustrated, birth rates for those under 20 fall, and out-migration, particularly among those from 20-45, increases. There will be fewer people in the working age groups and more seniors over the age of 70. The average age in 2016 was 49 years, but the Medium HS model predicts by 2036 this will increase to 56 years.

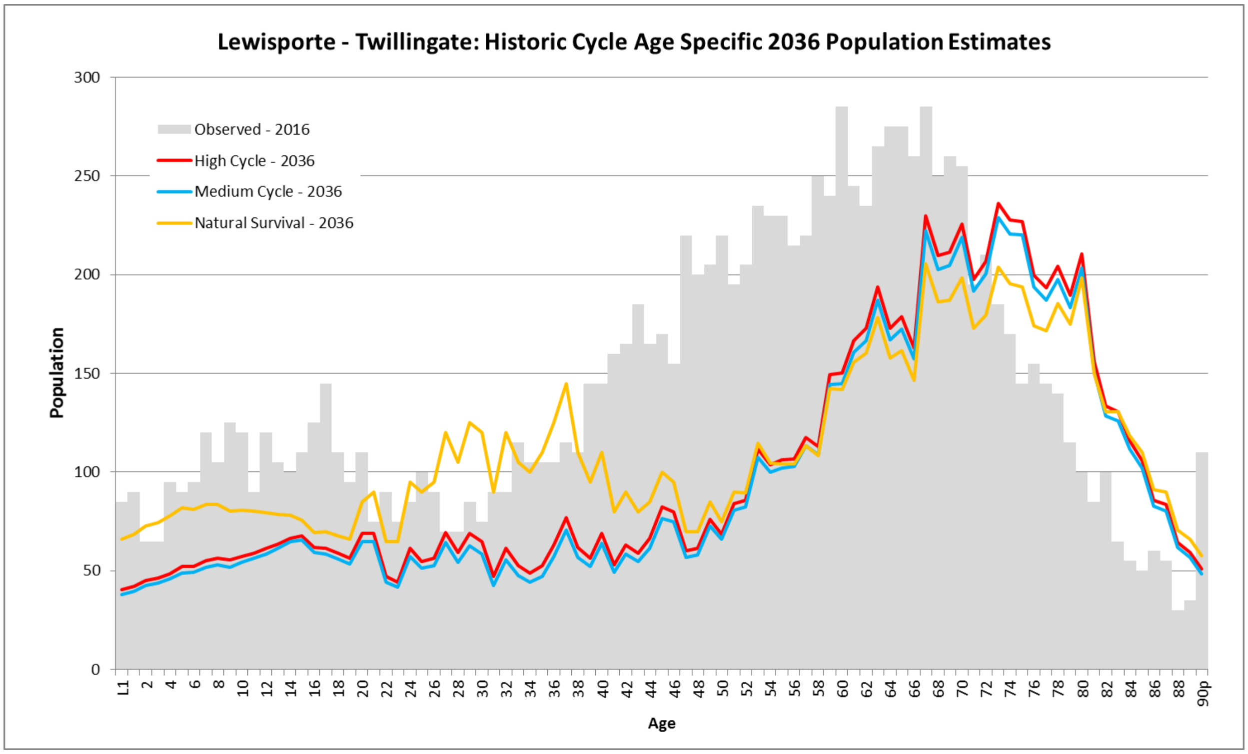


***Figure 3.34:* Lewisporte - Twillingate Area: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.13 Gander Bay – Fogo Island Area

The 2016 baseline population for the Gander Bay – Fogo Island Area (Figure 3.35) is 6,250.

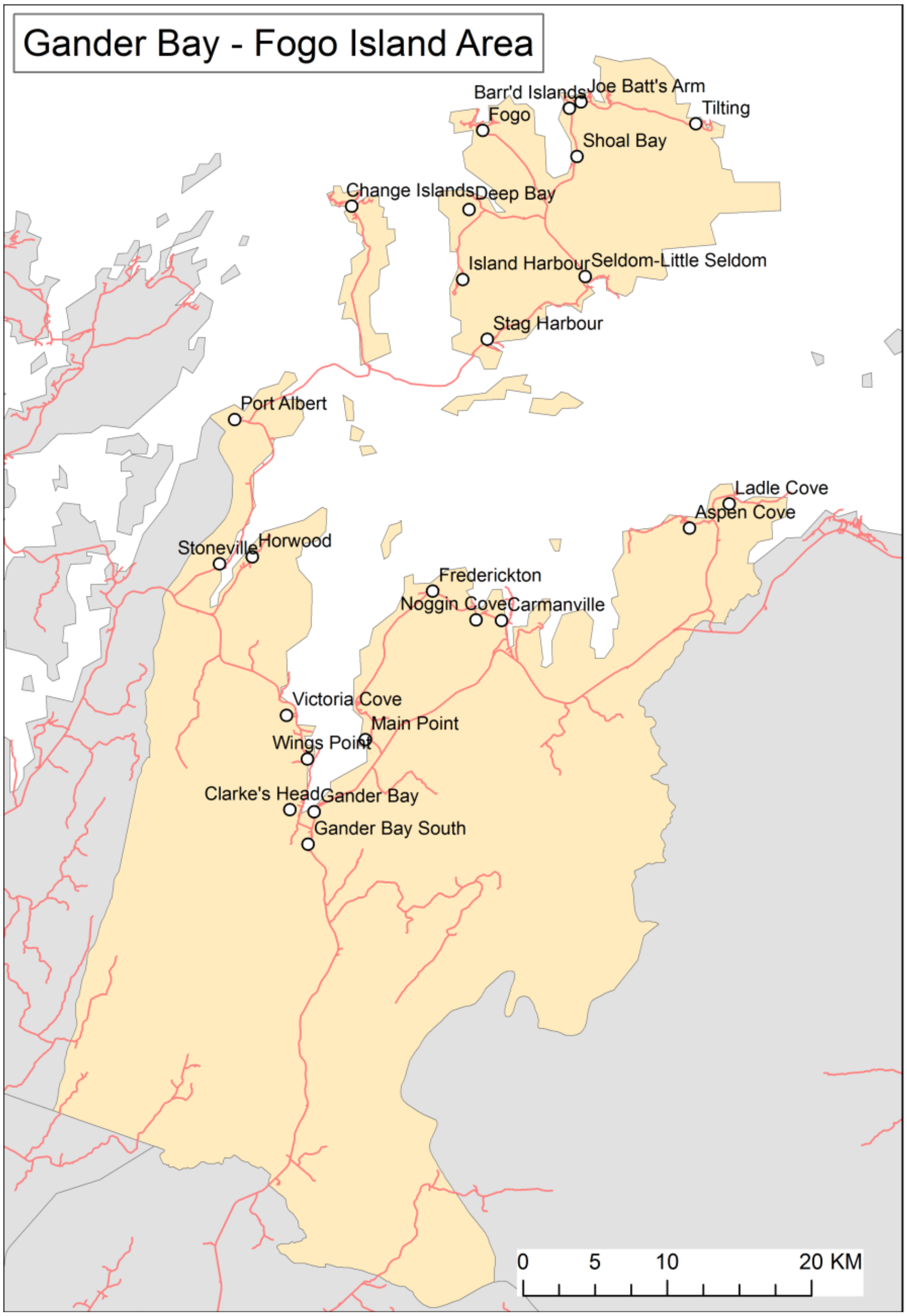


Figure 3.35: **Gander Bay – Fogo Island Area.**

The NS model for the Gander Bay – Fogo Island Area estimates a population of 5,252 by 2036, while the Medium HS model estimates a decline in the population to 4,339 (Table 3.12). For the same period, the RS model predicts a smaller population decrease, but even under the High scenario assumptions the total population would decline to 5,943.

***Table 3.12:* Gander Bay – Fogo Island Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	6250	6250	6250	6250	6250	6250
2017	6190	6163	6163	6205	6211	6221
2018	6151	6099	6099	6182	6195	6214
2019	6121	6042	6042	6167	6186	6215
2020	6081	5975	5975	6144	6170	6208
2021	6049	5913	5913	6128	6160	6208
2022	6009	5817	5842	6105	6144	6202
2023	5972	5723	5772	6085	6130	6198
2024	5934	5625	5698	6063	6115	6193
2025	5890	5522	5618	6037	6095	6183
2026	5849	5421	5539	6011	6076	6174
2027	5798	5334	5450	5979	6051	6158
2028	5753	5249	5364	5950	6028	6145
2029	5706	5160	5273	5918	6003	6130
2030	5653	5066	5178	5882	5974	6111
2031	5595	4969	5079	5845	5943	6089
2032	5536	4848	4978	5805	5910	6066
2033	5475	4726	4875	5764	5875	6041
2034	5404	4599	4766	5717	5835	6011
2035	5330	4471	4655	5669	5793	5979
2036	5252	4339	4539	5618	5748	5943

Note: Table row values for **Year 2016** is the baseline population for the survival model estimates

The NS model shows that if historical birth and death rate trends continue, the region will experience continual population decline of 16% over the projection period (Figure 3.36). When migration is considered (HS Medium scenario) the population loss is projected at 30.57%. A 70% (RS Medium scenario) replacement model sees a loss of 8.03 % and even a 100% replacement would still not maintain 2016 population levels.

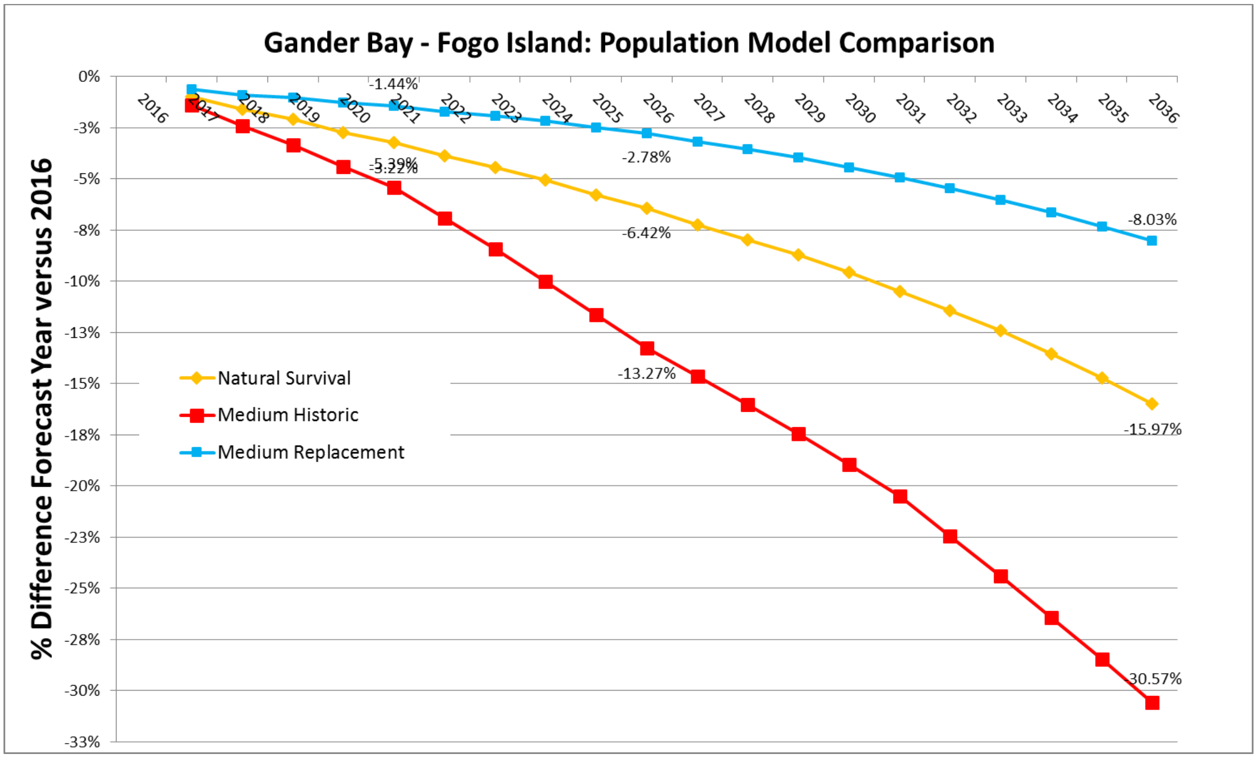


Figure 3.36: **Gander Bay – Fogo Island Area: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

Figure 3.37 presents the region's 2016 age structure along with the projected population age structure for 2036. The 2036 outcomes show that migration, the difference between the NS model and the HS model scenarios, has a particular impact on all cohorts under 45, but not thereafter. As with most other regions the population will age. By 2036, the average age will have increased to 56 years, from 47 years in 2016.

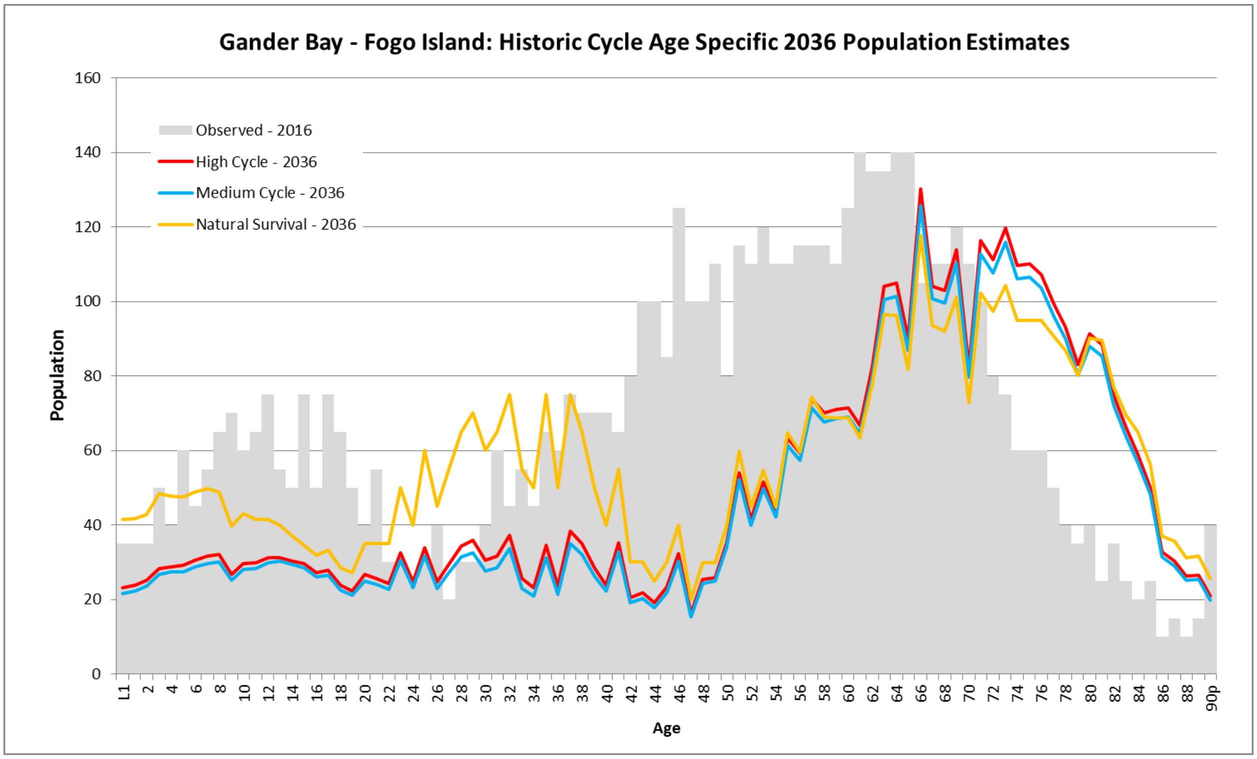


Figure 3.37: **Gander Bay – Fogo Island Area: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.14 Musgrave Harbour – Hare Bay Area

The 2016 baseline population for the Musgrave Harbour – Hare Bay Area (Figure 3.38) is 7,170.

Figure 3.38: **Musgrave Harbour – Hare Bay Area.**

The NS model shows a continual population decline, projecting a decrease to 5,870 by 2036 (Table 3.13). Under Medium scenario assumptions the HS model, which includes a migration component, projects that the population would decrease to 5,042 by 2036.

The RS model estimates that the 2036 population could range from 6,317 to 6,712 for the Low (50%) and High (100%) labour force replacement scenarios respectively, indicating that even with a 100% replacement strategy this would not be enough for this area to maintain its 2016 population level.

***Table 3.13:* Musgrave Harbour – Hare Bay Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	7170	7170	7170	7170	7170	7170
2017	7143	7126	7126	7156	7164	7175
2018	7096	7061	7061	7127	7142	7166
2019	7044	6992	6992	7095	7118	7153
2020	6987	6915	6915	7058	7089	7136
2021	6931	6839	6839	7023	7062	7121
2022	6878	6734	6763	6990	7037	7108
2023	6825	6627	6684	6956	7011	7094
2024	6776	6522	6607	6926	6989	7083
2025	6722	6411	6523	6891	6962	7068
2026	6664	6295	6432	6852	6931	7049
2027	6600	6199	6334	6809	6896	7026
2028	6535	6101	6234	6764	6859	7002
2029	6463	5996	6127	6716	6819	6973
2030	6391	5888	6018	6667	6778	6944
2031	6315	5776	5904	6614	6733	6911
2032	6233	5631	5783	6558	6685	6875
2033	6149	5487	5661	6502	6636	6838
2034	6055	5336	5530	6439	6581	6795
2035	5965	5190	5404	6379	6529	6754
2036	5870	5042	5274	6317	6475	6712

Note: Table row values for **Year 2016** is the baseline population for the survival model estimates

The percent change trends presented in Figure 3.39 also confirm that the inherent characteristics of the population cannot maintain the 2016 population. By 2036, the NS model predicts a population decline of 18.13% while the Medium HS model predicts a 29.68% decline.

The Medium RS model shows that a 70% replacement strategy would result in a 9.7% decline by 2036. A (High scenario) 100% replacement strategy would still mean a 6.39% population decline.

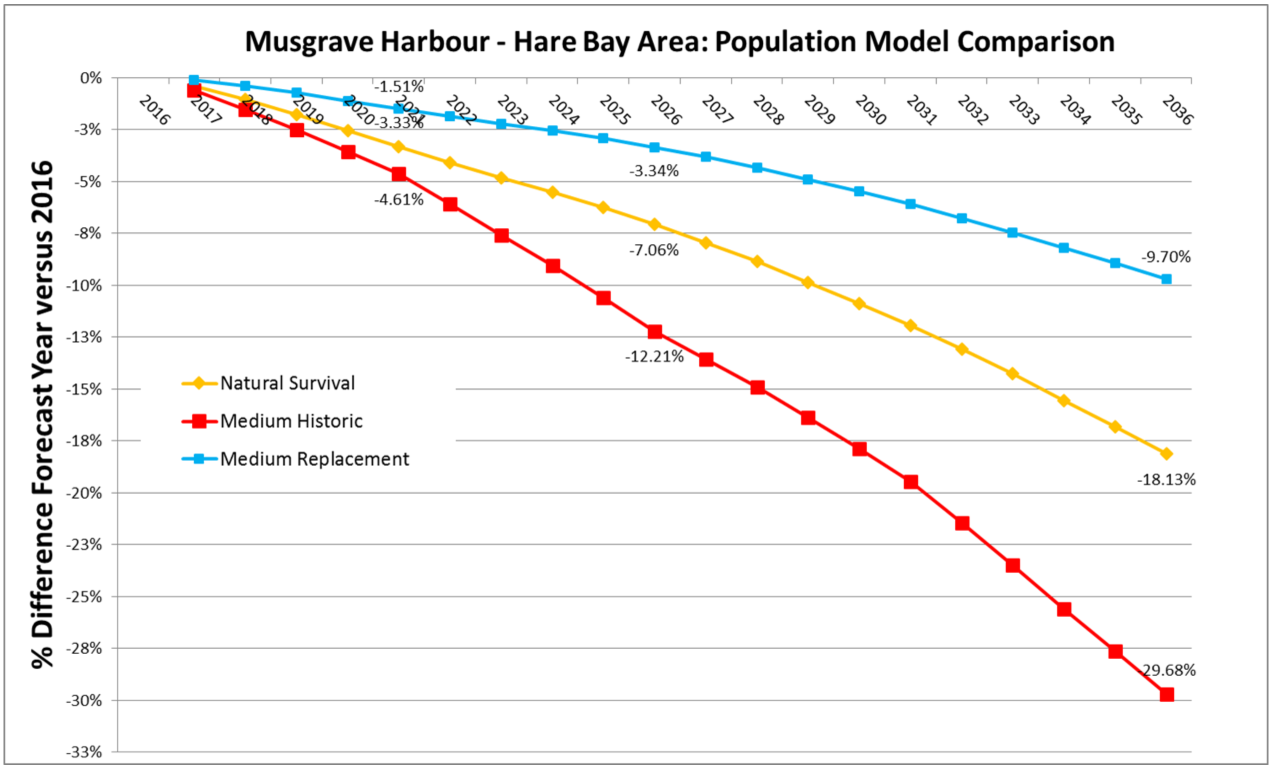


Figure 3.39: **Musgrave Harbour – Hare Bay Area: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

The age structure of the region's population in 2016 is shown in Figure 3.40. By 2036, the Medium HS model shows losses in all age cohorts under 70 and particularly in those in the working age groups. Out-migration is an important contributor to population losses among those under 50 and the average age of the population increases from 48 in 2016 to 56 by 2036.

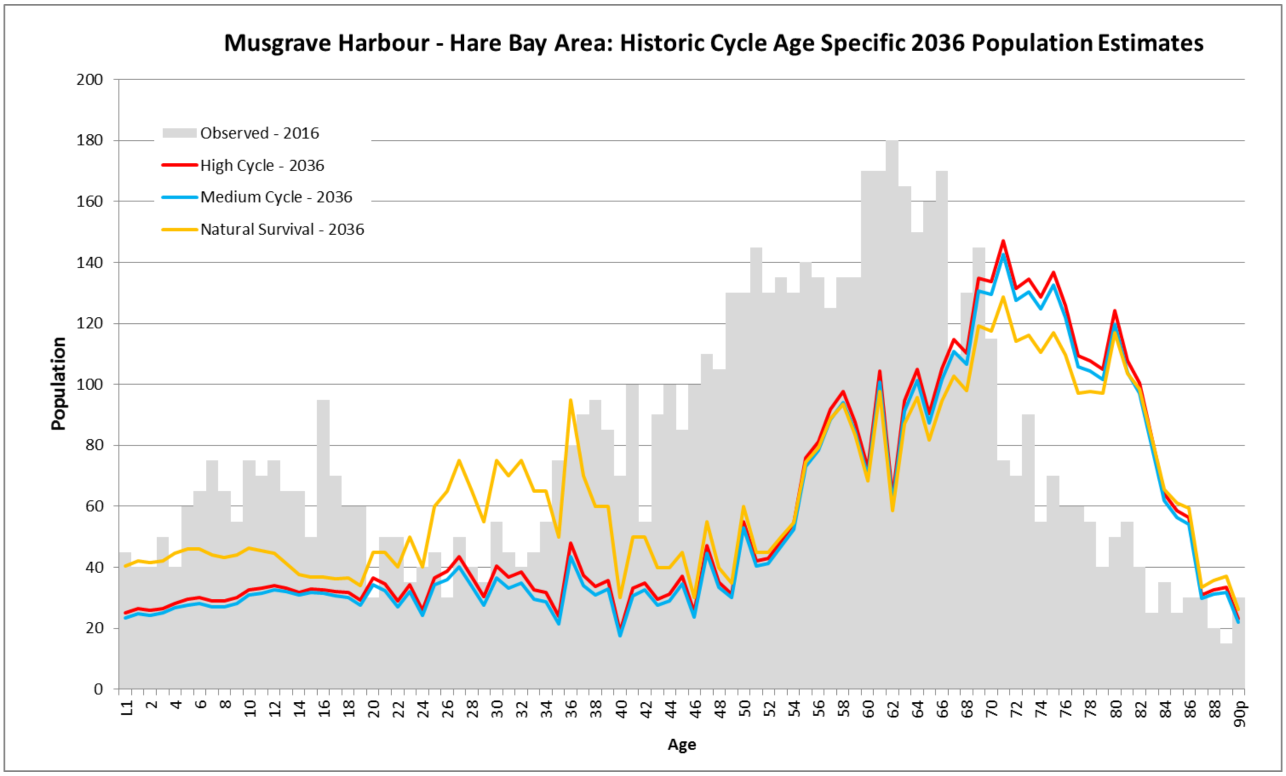


Figure 3.40: **Musgrave Harbour – Hare Bay Area: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.15 Gander - Gambo Area

The 2016 baseline population for the Gander - Gambo Area (Figure 3.41) is 19,625.

Figure 3.41: **Gander - Gambo Area.**

The NS model projects that the population would decrease to 17,116 by 2036 (Table 3.14). The HS outcomes for the Medium and High scenarios both indicate that if the migration cycles repeat in the future the population would decrease even more, to 15,799 and 16,657 respectively.

The results for the RS models show similar outcomes, with predicted population declines to 17,597 under the Low scenario and 18,214 under the High, once again indicating that even with replacement of all 'lost' workers, as a result of retirement, death, or out migration, the population will decrease over the forecast period.

Table 3.14: **Gander - Gambo Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	19265	19265	19265	19265	19265	19265
2017	19099	19109	19109	19124	19136	19154
2018	19024	19043	19043	19074	19097	19133
2019	18954	18977	18977	19027	19063	19116
2020	18865	18889	18889	18963	19011	19083
2021	18777	18797	18797	18898	18958	19048
2022	18692	18608	18703	18836	18908	19017
2023	18608	18420	18607	18774	18859	18986
2024	18527	18232	18511	18713	18811	18957
2025	18438	18032	18401	18644	18754	18919
2026	18347	17828	18286	18574	18696	18880
2027	18251	17703	18162	18498	18632	18834
2028	18145	17566	18025	18413	18560	18781
2029	18035	17421	17881	18325	18485	18724
2030	17920	17269	17729	18233	18405	18664
2031	17803	17112	17572	18140	18324	18602
2032	17677	16860	17403	18039	18236	18532
2033	17546	16602	17227	17935	18144	18459
2034	17405	16334	17039	17823	18045	18378
2035	17258	16063	16845	17708	17942	18294
2036	17116	15799	16657	17597	17844	18214

Note: Table row values for **Year 2016** is the baseline population for all model estimates

Figure 3.42 shows that the NS model trend would result in an 11.15% population loss by 2036 while the Medium scenario HS model, which includes migration, would see a 17.99% decline. A worker replacement strategy would not be enough to maintain 2016 population levels. As indicated in Figure 3.42 a Medium scenario (70% replacement) model would see a loss of 7.38% while the High Scenario (100% replacement) would still only reduce this to -5.45%.

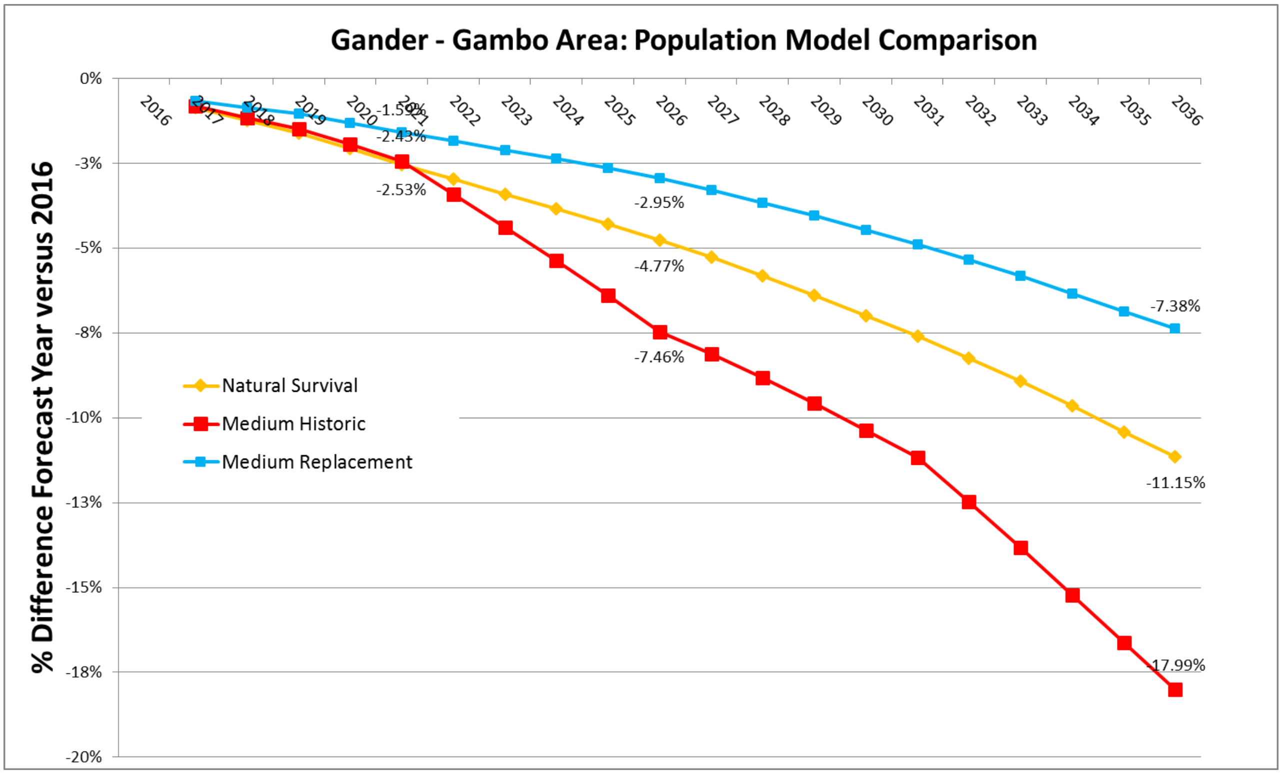


Figure 3.42: **Gander - Gambo Area: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

Figure 3.43 presents the region's projected population age structure for 2036. A loss in all cohorts under 65 is projected, with out-migration being particularly important among those in the 20-45 age groups. Some in-migration is expected among those 50 and older, contributing to the increased average age of the population. In 2016 the average age was 44 years, the Medium HS model predicts by 2036 this will increase to 50 years.

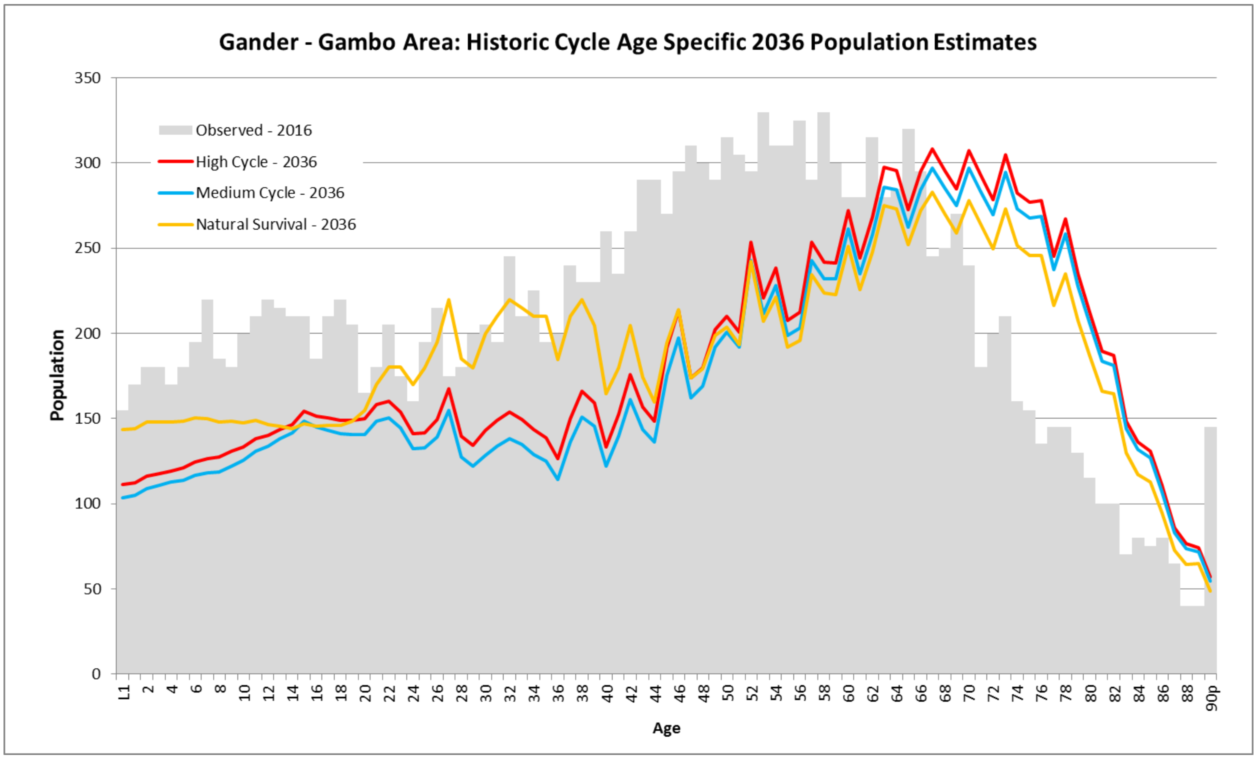


Figure 3.43: **Gander - Gambo Area: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.16 Clarenville - Bonavista Area

The 2016 baseline population for the Clarenville - Bonavista Area (Figure 3.44) is 23,170.

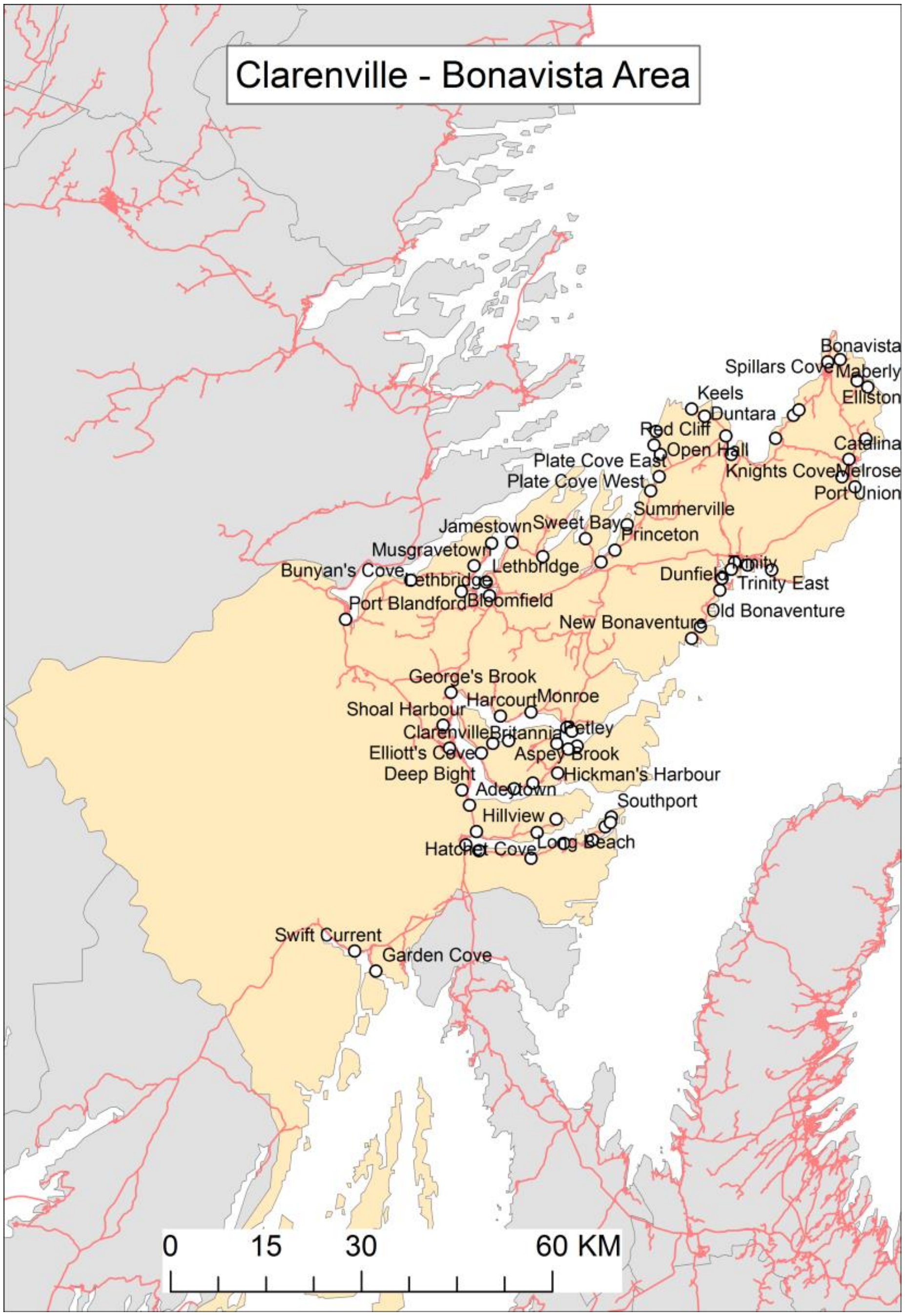


Figure 3.44: **Clarenville - Bonavista Area.**

The NS model suggests that the population would decrease to 19,128 by 2036, while the HS model, which includes migration effects, shows greater declines to 17,386 and 18,292 under the Medium and High scenarios respectively.

The results for the RS models also predict population declines. The Low (50%) and High (100%) Replacement scenarios indicate population declines to 20,438 and 21,501 respectively; indicating that even full replacement of the lost workforce would be insufficient to maintain 2016 population numbers.

Table 3.15: **Clarenville – Bonavista Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	23170	23170	23170	23170	23170	23170
2017	23014	23001	23001	23054	23074	23104
2018	22860	22833	22833	22947	22988	23050
2019	22699	22655	22655	22836	22898	22991
2020	22537	22475	22475	22726	22809	22933
2021	22367	22283	22283	22611	22715	22871
2022	22198	21982	22088	22498	22623	22810
2023	22016	21668	21877	22375	22521	22740
2024	21838	21356	21668	22257	22424	22676
2025	21657	21038	21449	22135	22324	22607
2026	21473	20715	21223	22011	22222	22538
2027	21277	20476	20981	21879	22111	22459
2028	21065	20219	20722	21736	21990	22370
2029	20846	19946	20446	21586	21861	22273
2030	20623	19666	20162	21433	21730	22175
2031	20387	19373	19866	21274	21592	22069
2032	20150	18985	19567	21115	21455	21964
2033	19912	18598	19266	20956	21317	21859
2034	19657	18196	18946	20785	21168	21742
2035	19391	17786	18616	20609	21013	21619
2036	19128	17386	18292	20438	20863	21501

Note: Table row values for **Year 2016** is the baseline population for all model estimates

Figure 3.45 indicates that the NS model trend predicts negative percent differences from the 2016 baseline and by 2036 the population decreases by 17.44%. When historic migration pattern data are included the HS model predicts an overall population decline, consistently trending below the NS model line. By 2036 it will have decreased by 24.96%.

The third element of Figure 3.45 illustrates the effect of replacing those in the workforce who retire, die or leave the region. The Medium Replacement scenario illustrates what that if 70% of the "lost" workforce were to be replaced by 2036 the population would decrease by 9.96%.

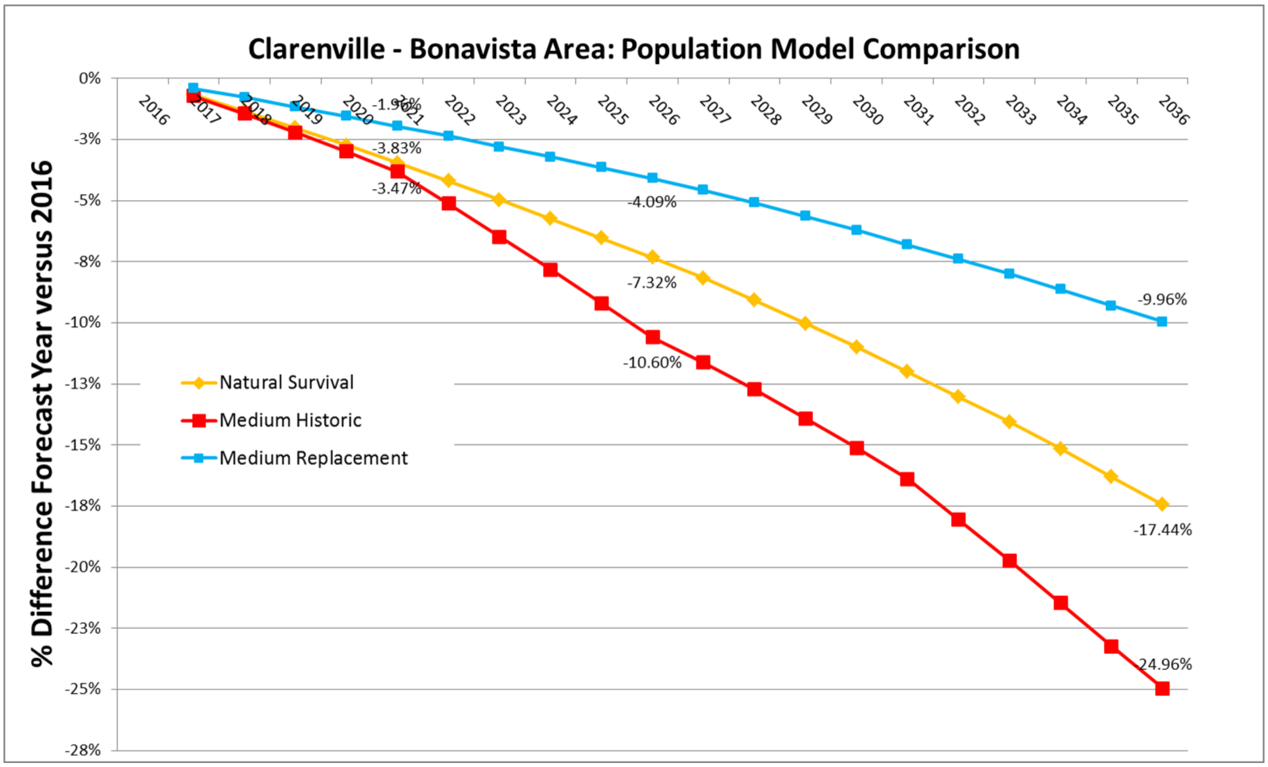


Figure 3.45: **Clarenville - Bonavista Area: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

Figure 3.46 presents the region's projected population age structure for 2036. Some out-migration is expected among those 15 and under and those between 20 and 45. Some in-migration is anticipated among those in their mid-50s and older. The average age in 2016 was 46 years, but the Medium HS model predicts by 2036 this will increase to 53 years.

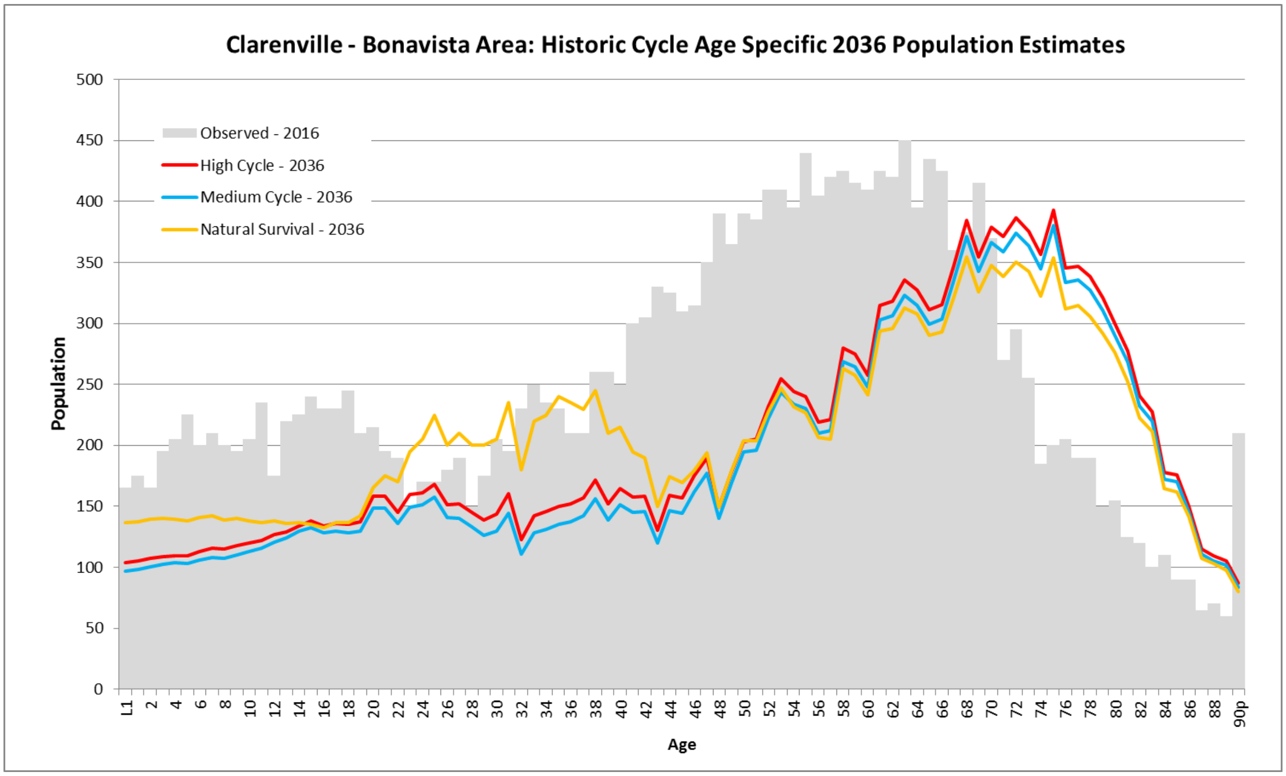


Figure 3.46: **Clarenville - Bonavista Area: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.17 The Burin Peninsula Area

The 2016 baseline population for the Burin Peninsula Area (Figure 3.47) is 19,795.

Figure 3.47: **The Burin Peninsula Area.**

With a 2016 population of 19,795 the NS and HS (Medium scenario) models predict a population decline for the Burin Peninsula to 16,624 and 14,768 respectively (Table 3.16). Similarly the RS Models predict declines to 17,829 in the Low scenario and 18,791 in the High scenario by 2036. This is the overall result of lower fertility rates for the region and out-migration factors. Even with a strategy to replace 100% of the retired work force, the population could not be maintained at its 2016 level.

Table 3.16: **Burin Peninsula Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	19795	19795	19795	19795	19795	19795
2017	19725	19686	19686	19759	19778	19805
2018	19619	19539	19539	19697	19734	19790
2019	19499	19377	19377	19624	19680	19763
2020	19376	19213	19213	19551	19626	19738
2021	19254	19048	19048	19481	19574	19715
2022	19125	18781	18872	19404	19517	19686
2023	18999	18516	18696	19330	19462	19660
2024	18874	18253	18520	19258	19409	19637
2025	18743	17983	18336	19180	19351	19608
2026	18605	17702	18139	19095	19285	19571
2027	18459	17499	17933	19004	19214	19529
2028	18298	17279	17711	18901	19130	19475
2029	18120	17042	17471	18786	19035	19408
2030	17939	16802	17228	18669	18938	19340
2031	17742	16547	16970	18543	18831	19262
2032	17533	16198	16697	18407	18715	19176
2033	17318	15848	16420	18269	18596	19086
2034	17092	15488	16130	18124	18470	18989
2035	16863	15130	15839	17979	18344	18893
2036	16624	14768	15540	17829	18214	18791

Note: Table row values for **Year 2016** is the baseline population for the survival model estimates

These trends are further illustrated in Figure 3.48. For all yearly predictions, the NS, Medium HS, and Medium RS models all indicate a continual population decline if historical trends continue. The NS model shows a 16.02% decline by 2036, the Medium scenario HS model a 25.04% decrease, and the Medium scenario RS model a decrease of 7.99%. Even the High scenario RS model (100% replacement) would still see a 5.07% decrease in population.

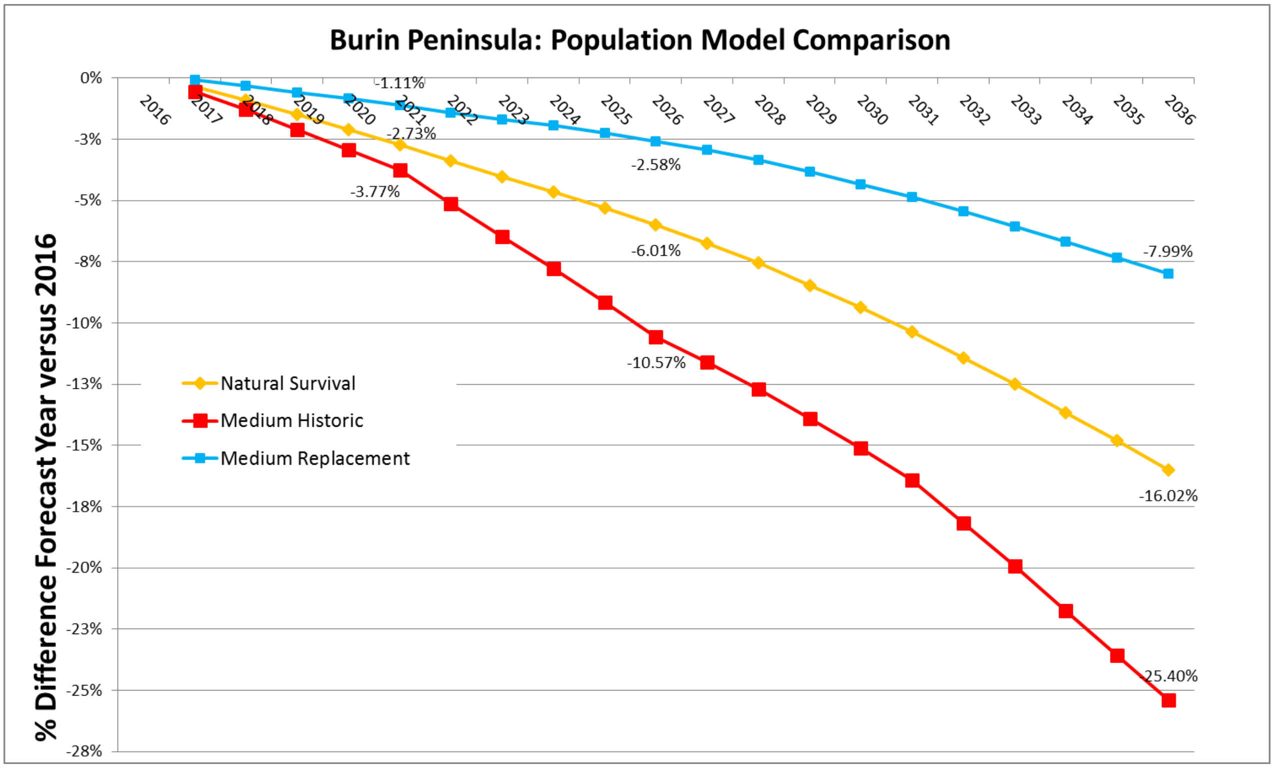


Figure 3.48: **Burin Peninsula Area: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

The 2016 age structure and the 2036 prediction, is presented in Figure 3.49. The figure highlights an age structure typical of a slow growth, aging population with lower births, population losses among the very young and 20-45 year cohorts and an aging population. Based on the Medium HS model the average age of the population will increase from 46 years in 2016 to 53 years by 2036.

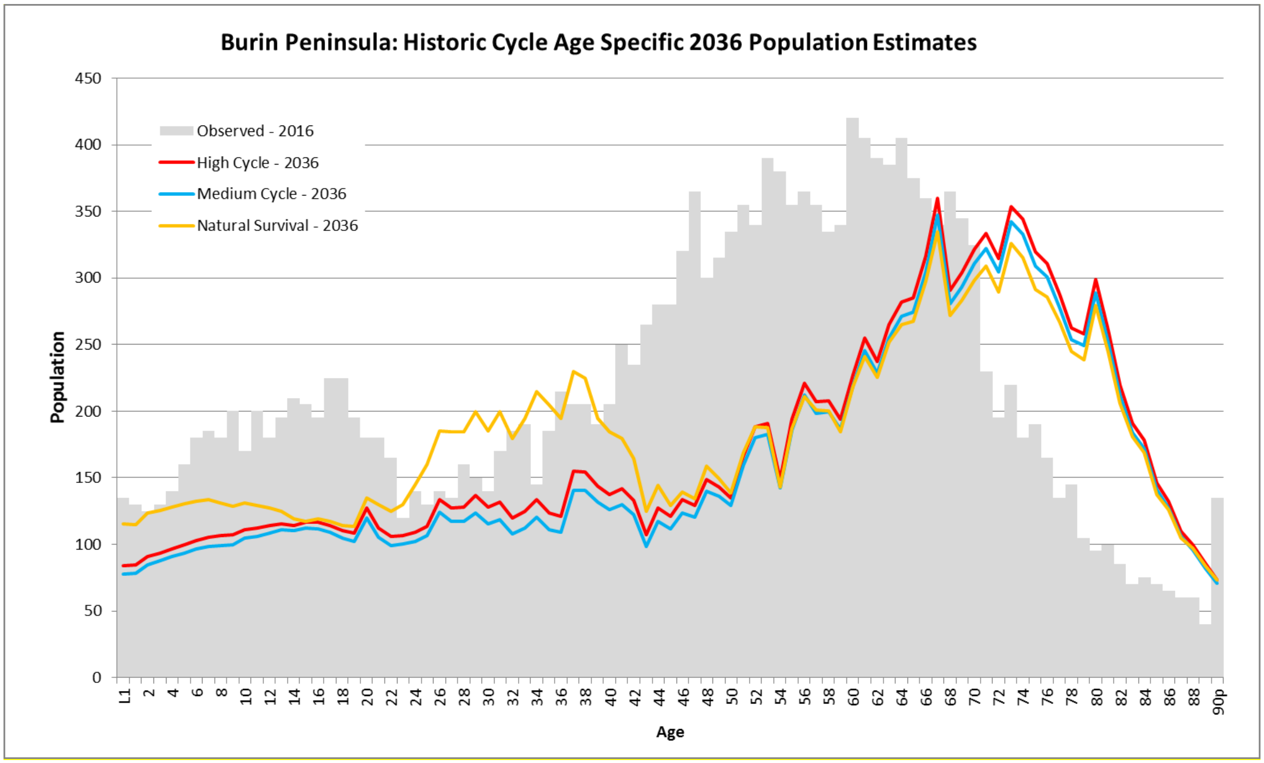


Figure 3.49: **Burin Peninsula Area: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.18 Isthmus of Avalon Area

The 2016 baseline population for the Isthmus of Avalon Area (Figure 3.50) is 4,205.

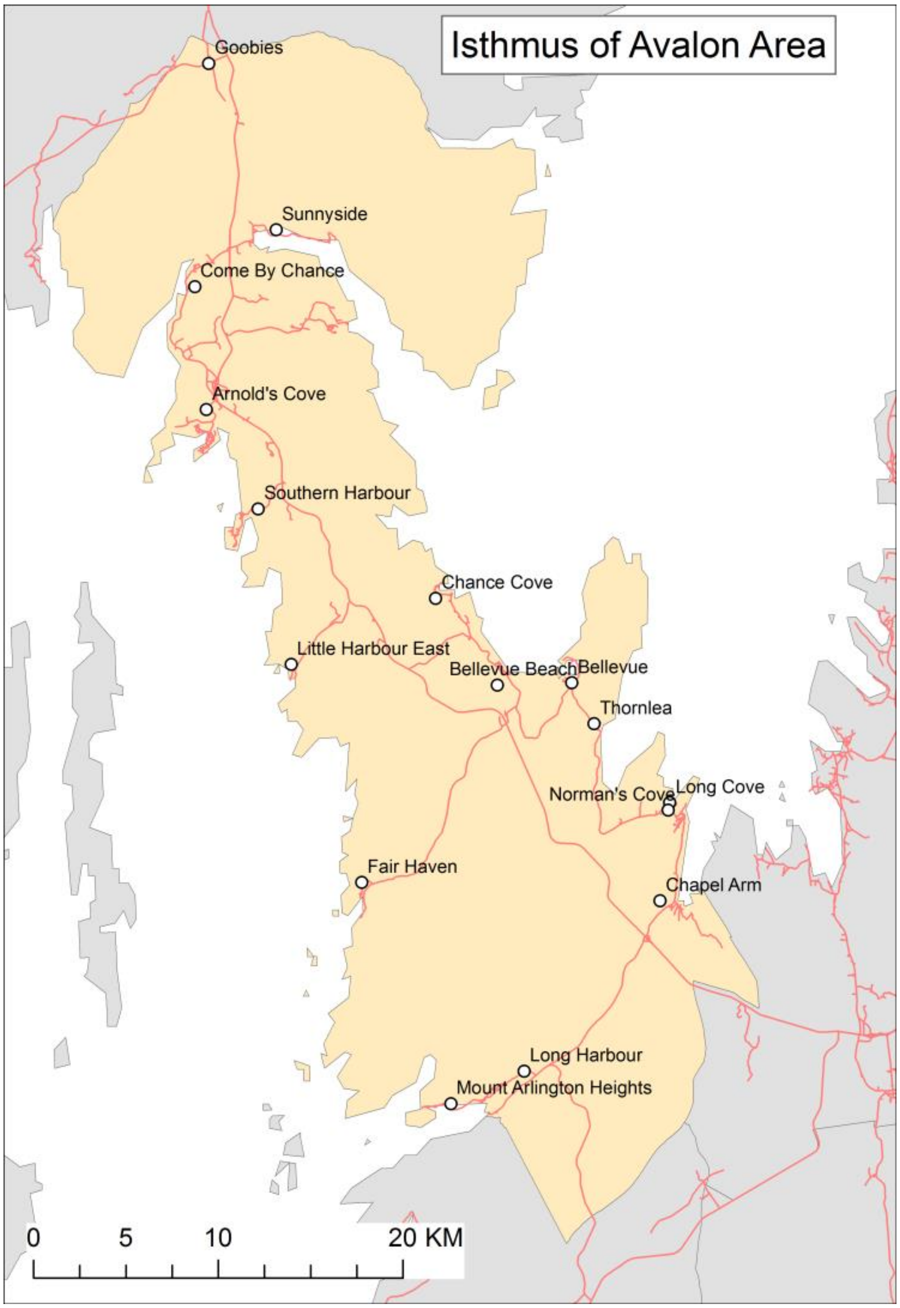


Figure 3.50: **Isthmus of Avalon Area.**

The 2016 census population for the Isthmus of Avalon Area was 4,205. Like many areas analyzed in this report, the Isthmus of Avalon area does not have the capacity to maintain its population over the projection period. For 2036, the NS estimate is 3,229 and the HS Medium and High scenarios range from 3,117 to 3,278 (Table 3.17). In this case there is relatively little difference between the scenario projections (see Figure 3.51) with declines of 23.21% and 25.87% projected for the NS and Medium scenario HS models respectively.

Table 3.17: **Isthmus of Avalon Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	4205	4205	4205	4205	4205	4205
2017	4179	4189	4189	4190	4195	4203
2018	4147	4166	4166	4171	4181	4197
2019	4109	4136	4136	4146	4162	4185
2020	4078	4112	4112	4128	4149	4181
2021	4035	4076	4076	4098	4125	4165
2022	3998	4026	4045	4075	4107	4155
2023	3958	3972	4009	4048	4086	4142
2024	3914	3916	3971	4019	4063	4127
2025	3868	3855	3929	3988	4037	4110
2026	3818	3791	3882	3954	4008	4089
2027	3768	3744	3834	3919	3979	4068
2028	3714	3691	3781	3881	3946	4044
2029	3656	3633	3723	3840	3911	4017
2030	3604	3581	3671	3804	3880	3995
2031	3549	3527	3616	3767	3849	3972
2032	3490	3450	3555	3726	3814	3946
2033	3427	3369	3489	3683	3776	3916
2034	3365	3290	3424	3641	3740	3888
2035	3296	3201	3349	3594	3699	3855
2036	3229	3117	3278	3550	3660	3825

Note: Table row values for **Year 2016** is the baseline population for the survival model estimates

Under the RS model, not even a 100% replacement rate can keep the population at the 2016 level. By 2036, the Medium RS model (70% replacement) estimates a population decline to 3,660 (-12.96%, Figure 3.51) and the High RS model (100% replacement) estimates a population decline to 3,825 (-9.0%).

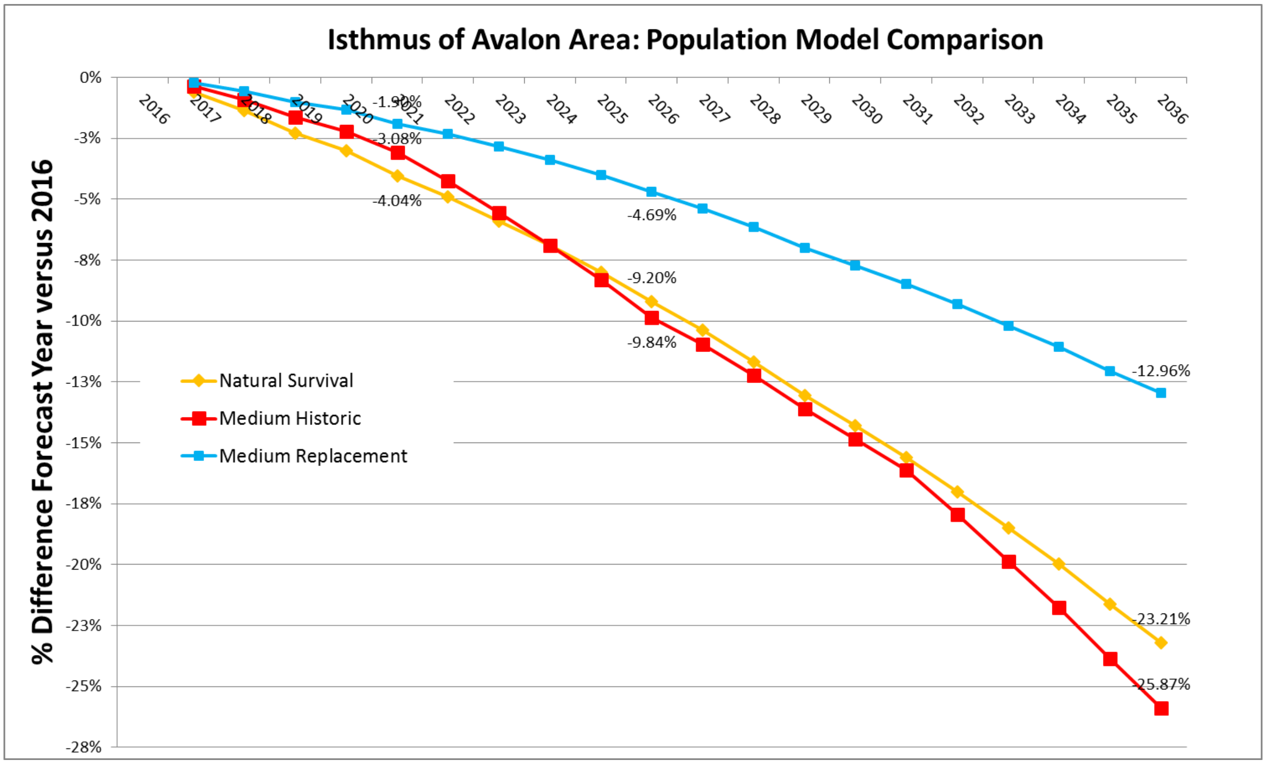


Figure 3.51: **Isthmus of Avalon Area: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

The age structure of the region's population in 2036 indicates losses among the youngest age cohorts and those from 25-40 because of out-migration and an increase in the population in the 70+ cohorts in part because of in-migration (Figure 3.52). Under the Medium HS model the average age of the population would increase from 49 in 2016 to 55 years in 2036.

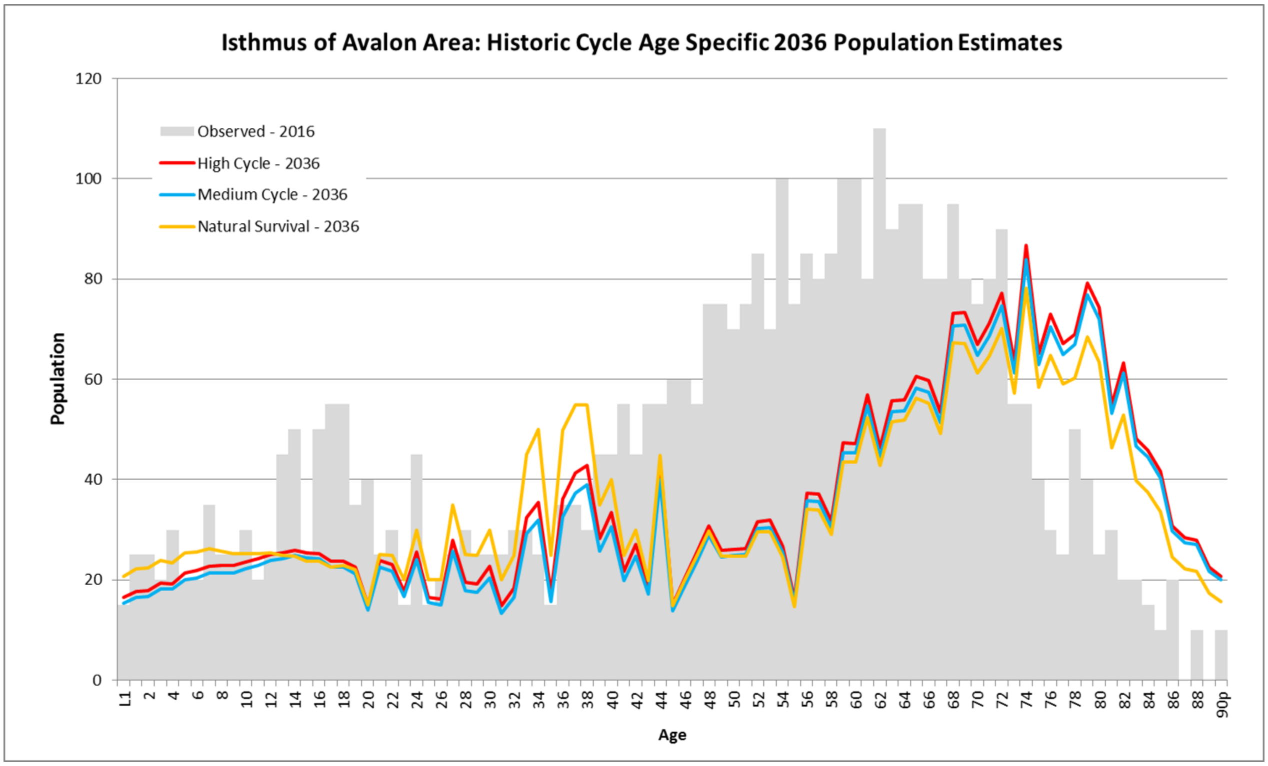


Figure 3.52: **Isthmus of Avalon Area: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.19 Trinity – Conception Area

The 2016 baseline population for the Trinity - Conception Area (Figure 3.53) is 46,205.

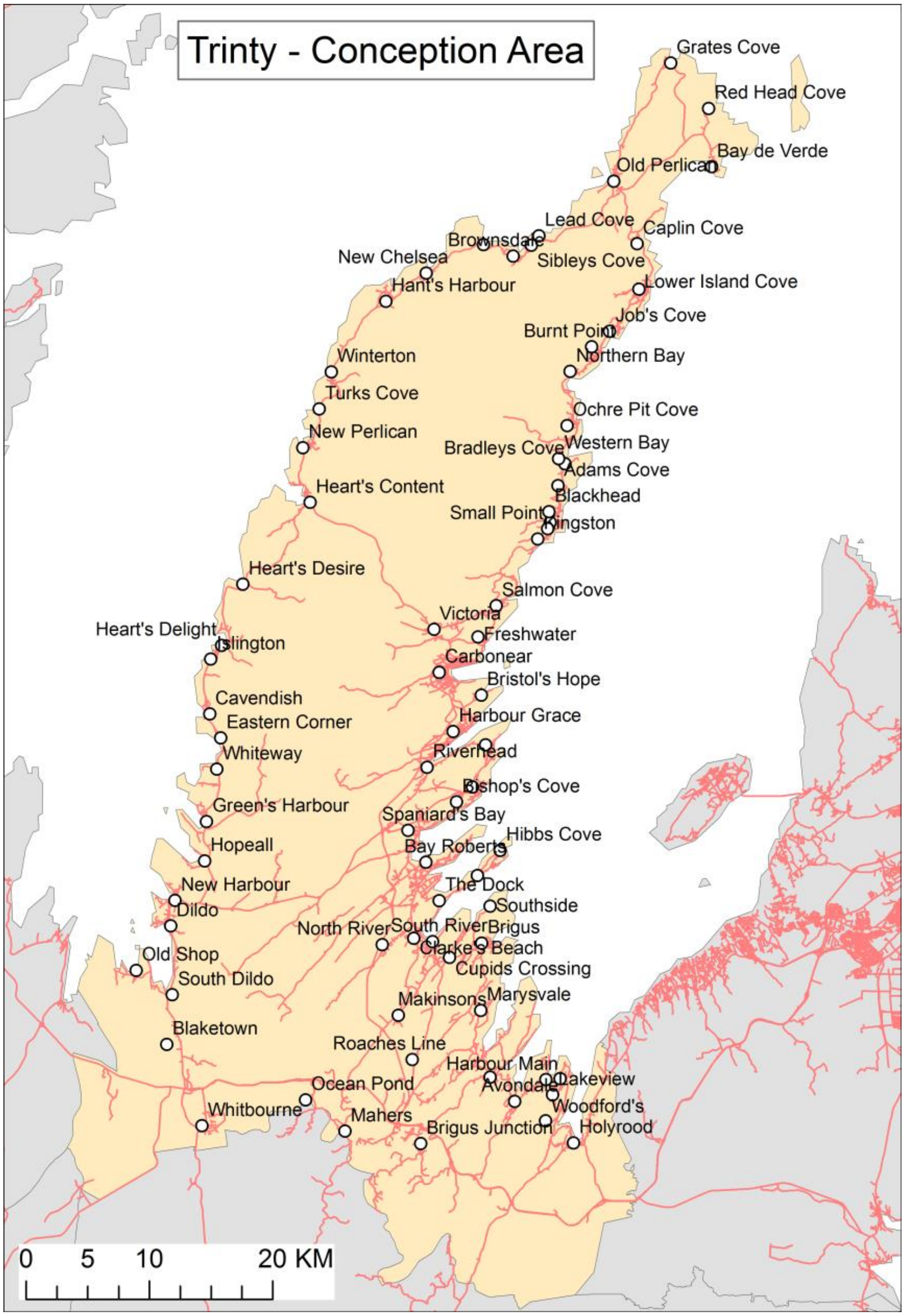


Figure 3.53: **Trinity - Conception Area.**

With a 2016 baseline population of 46,205, the Trinity - Conception Area is the second largest, in terms of population, of the areas studied in this report. Table 3.18 shows that the NS model estimates a population of 38,688 by 2036 while the Medium and High HS model scenarios estimate populations of 37,401 and 39,421 respectively.

Similarly, all three RS scenarios – Low, Medium and High – predict long-term population decline. By 2036, the Medium RS model (70% replacement) predicts a population decrease to 40,863 and the High RS model (100% replacement) predicts a decrease to 42,833. These results indicate that even with a 100% replacement strategy, this area will continue to experience population decline.

Table 3.18: **Trinity - Conception Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	46205	46205	46205	46205	46205	46205
2017	45832	45933	45933	45908	45945	46001
2018	45585	45785	45785	45747	45822	45935
2019	45316	45609	45609	45568	45681	45851
2020	45023	45401	45401	45367	45519	45746
2021	44714	45170	45170	45155	45345	45631
2022	44392	44697	44917	44932	45162	45506
2023	44070	44219	44656	44711	44980	45383
2024	43736	43725	44377	44480	44788	45251
2025	43399	43217	44082	44244	44592	45114
2026	43043	42688	43763	43994	44382	44964
2027	42678	42352	43428	43735	44163	44805
2028	42291	41988	43065	43459	43926	44628
2029	41889	41599	42677	43168	43676	44437
2030	41476	41192	42270	42869	43417	44238
2031	41054	40770	41848	42562	43150	44032
2032	40605	40117	41391	42236	42864	43806
2033	40149	39459	40926	41907	42575	43577
2034	39666	38774	40430	41559	42267	43330
2035	39183	38091	39931	41213	41961	43083
2036	38688	37401	39421	40863	41651	42833

Note: Table row values for **Year 2016** is the baseline population for the survival model estimates

This decline is also illustrated by the predicted percent change trends displayed in Figure 3.54, where all model trends indicate a long-term population decrease. The NS percent difference between 2016 and 2036 is -16.27%. The Medium HS model indicates that there is some out-migration impact on the population with the 2036 predicted percentage decrease being 19.05% by 2036. Under the Medium RS model assumptions, population growth is negative over the study period, with a decrease of 9.86% by 2036.

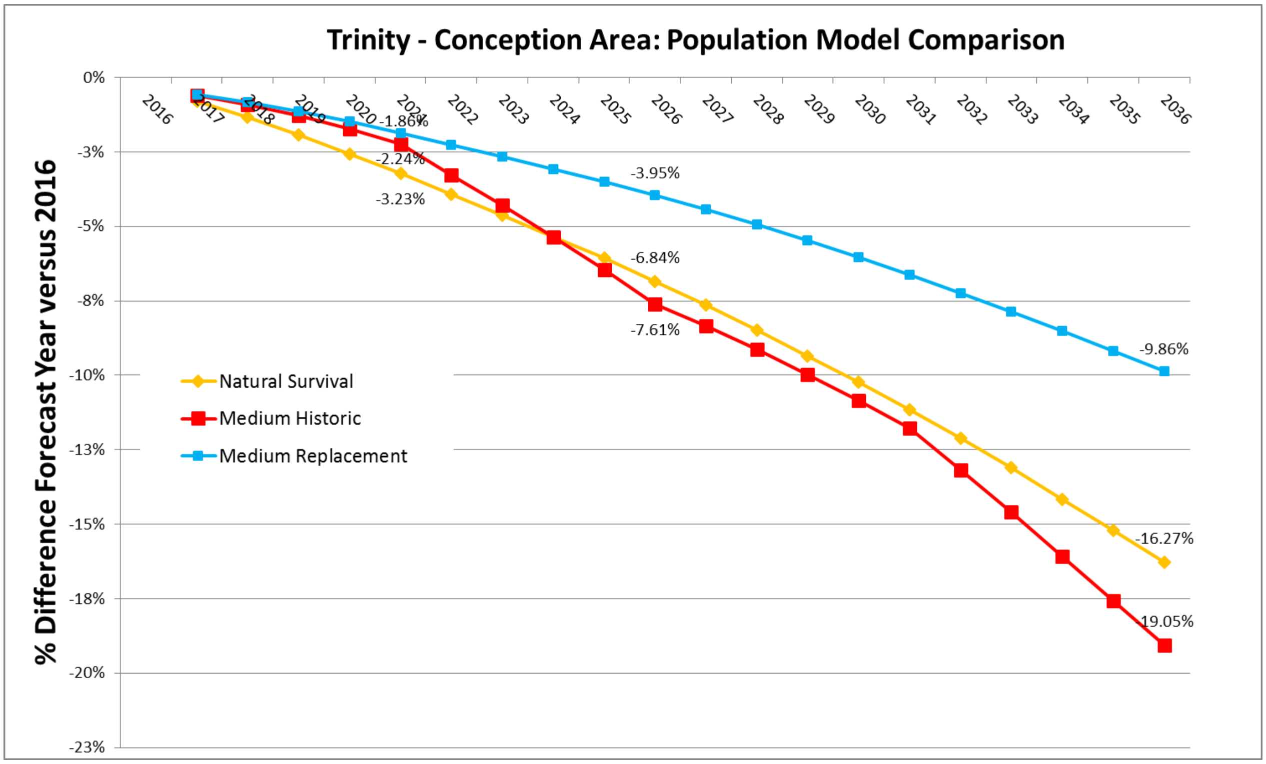


Figure 3.54: **Trinity - Conception Area: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

The 2016 and 2036 age structures are shown in Figure 3.55. While some outmigration is expected to continue among the very young (under 12) and those in the 20-40 age cohorts, thereafter, older age cohorts might see some increase from in-migration. Overall, however, the populations will both decline and age over the projection period. The average age is estimated to increase from 45 years in 2016 to 51 years by 2036.

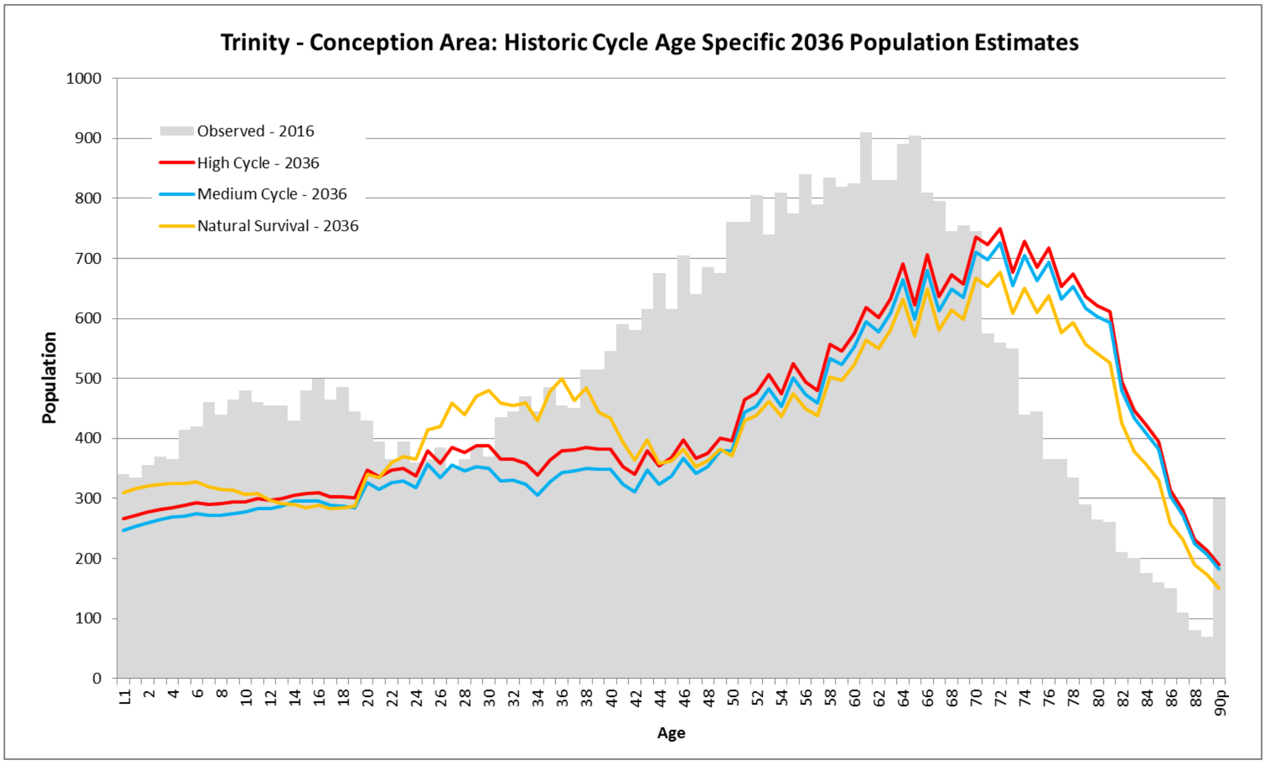


Figure 3.55: **Trinity – Conception Area: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.20 Placentia – Point Lance Area

The 2016 baseline population for the Placentia – Point Lance Area (Figure 3.56) is 4,815.

Figure 3.56: **Placentia – Point Lance Area.**

Table 3.19 shows predicted population decreases for all projection models. The NS model estimates a population of 3,833 by 2036, while the Medium and High HS model scenarios estimate the population at 3,271 and 3,423 respectively. The RS model shows similar long-term population declines. By 2036, the Medium RS model (70% replacement) predicts a population decrease to 4,125 and the High RS model (100% replacement) to 4,362. These results indicate that even the replacement of 100% of the 'lost' workforce, from retirement, death, and out-migration, would still not be enough to maintain 2016 population levels.

Table 3.19: **Placentia – Point Lance Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	4815	4815	4815	4815	4815	4815
2017	4749	4732	4732	4760	4765	4772
2018	4713	4679	4679	4735	4745	4759
2019	4673	4622	4622	4707	4721	4742
2020	4635	4568	4568	4680	4699	4728
2021	4596	4514	4514	4654	4678	4713
2022	4562	4444	4464	4632	4661	4703
2023	4529	4374	4413	4610	4643	4693
2024	4492	4299	4357	4584	4623	4680
2025	4452	4222	4297	4556	4599	4664
2026	4414	4144	4237	4529	4577	4649
2027	4367	4077	4168	4496	4549	4627
2028	4317	4005	4095	4461	4518	4604
2029	4264	3931	4020	4424	4486	4579
2030	4211	3855	3942	4386	4452	4553
2031	4152	3774	3860	4344	4416	4523
2032	4096	3679	3780	4305	4381	4496
2033	4035	3580	3695	4262	4343	4465
2034	3969	3477	3606	4217	4302	4431
2035	3903	3376	3516	4172	4262	4398
2036	3833	3271	3423	4125	4220	4362

Note: Table row values for **Year 2016** is the baseline population for the survival model estimates

Figure 3.57 illustrates the relative changes predicted for each model. The NS model indicates a population decrease of 20.39 %. The Medium HS scenario, which includes migration, indicates losses of 32.07% while the Medium (70% replacement scenario) RS model indicates a 12.37% decline by 2036.

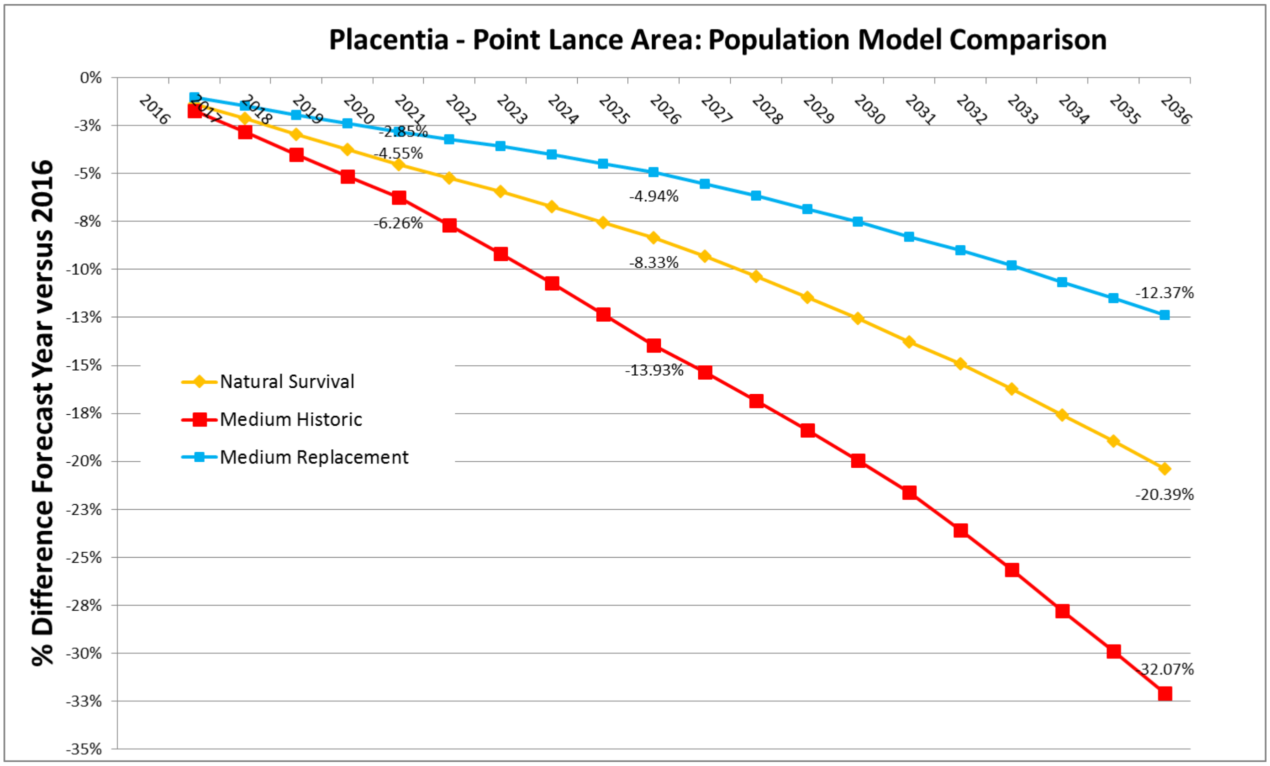


Figure 3.57: **Placentia – Point Lance Area: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

The 2016 and 2036 age structures presented in Figure 3.58 show that out-migration will continue to characterize all cohorts less than 50 years of age. By 2036 there will be very few people in each of the cohorts under 60 years of age. The largest cohorts will be those between 70 and 80 years and the average population age under the Medium HS model will increase from 48 years in 2016 to 56 by 2036.

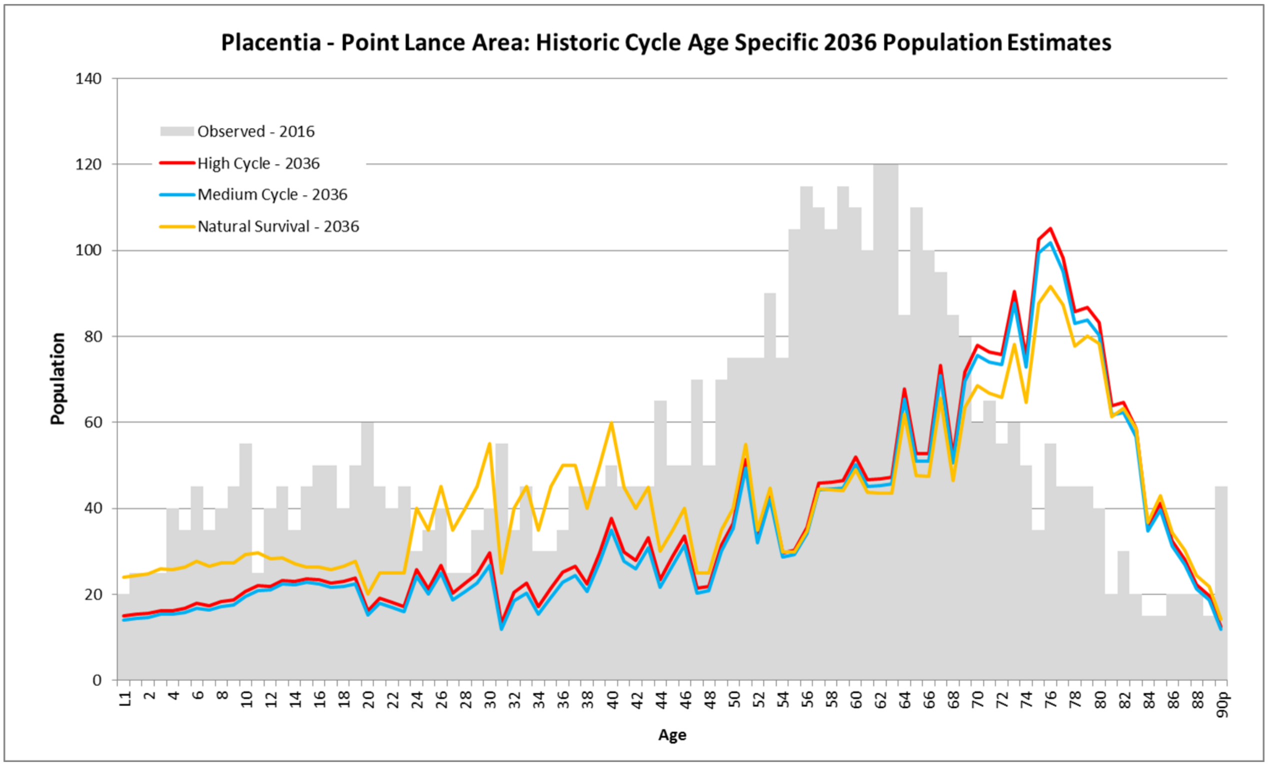


Figure 3.58: **Placentia – Point Lance Area: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.21 Southern Avalon Area

The 2016 baseline population for the Southern Avalon Area (Figure 3.59) is 6,625.

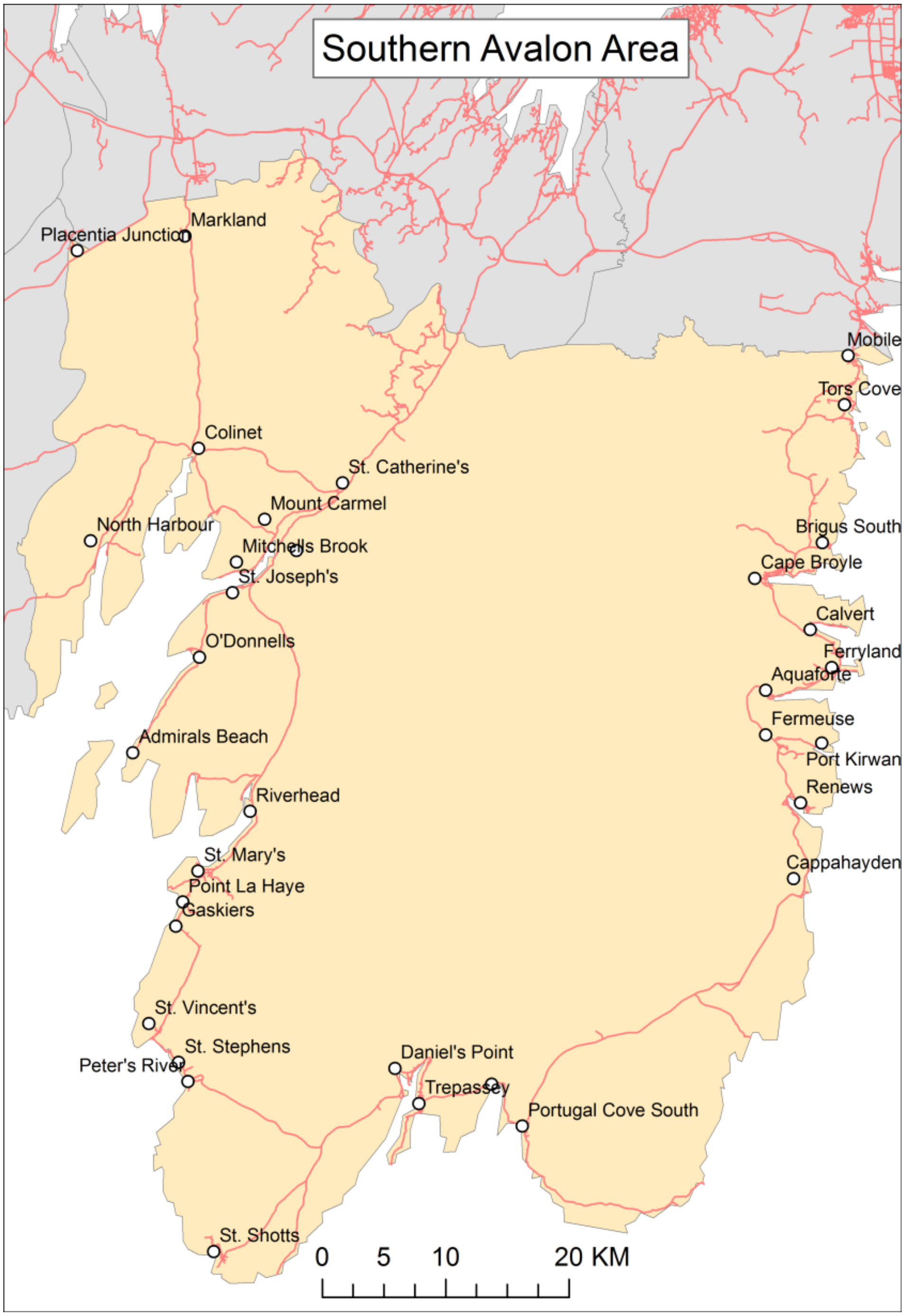


***Figure 3.59:* Southern Avalon Area.**

With a 2016 population of 6,625, the NS model for the Southern Avalon Area estimates a population of 5,130 by 2036, while the Medium HS model estimates a population of 4,263 (Table 3.20). For the same period, the RS model predicts a population decrease in the Low scenario to 5,841 and to 6,295 in the High case.

***Table 3.20:* Southern Avalon Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	6625	6625	6625	6625	6625	6625
2017	6634	6605	6605	6650	6659	6672
2018	6577	6520	6520	6616	6634	6660
2019	6534	6448	6448	6596	6623	6663
2020	6488	6374	6374	6575	6611	6664
2021	6436	6294	6294	6549	6594	6661
2022	6375	6178	6204	6516	6570	6650
2023	6320	6066	6118	6489	6552	6647
2024	6266	5953	6030	6463	6535	6643
2025	6206	5833	5934	6433	6514	6636
2026	6140	5705	5829	6397	6488	6624
2027	6068	5596	5718	6358	6458	6607
2028	5988	5479	5598	6314	6423	6586
2029	5902	5357	5474	6266	6384	6561
2030	5805	5225	5339	6211	6338	6529
2031	5703	5089	5201	6155	6291	6495
2032	5594	4926	5057	6095	6240	6458
2033	5485	4763	4912	6034	6189	6421
2034	5374	4601	4766	5973	6137	6382
2035	5253	4433	4612	5908	6081	6340
2036	5130	4263	4456	5841	6023	6295

Note: Table row values for **Year 2016** is the baseline population for the survival model estimates

For all yearly predictions, all three models (NS, HS, and RS) predict continual population decline if historical trends continue (Figure 3.60). The NS model indicates a 22.57% decline by 2036. Including migration, the Medium HS model indicates a 35.66% decrease by 2036. Under the Medium RS model assumptions, the 2036 percentage difference from the 2016 baseline is -9.09%. This result indicates that a 70% workforce replacement would not be able to maintain the labour force at its 2016 level. This conclusion also applies to the High (100% replacement) scenario in which the population would decline by 5% by 2036.

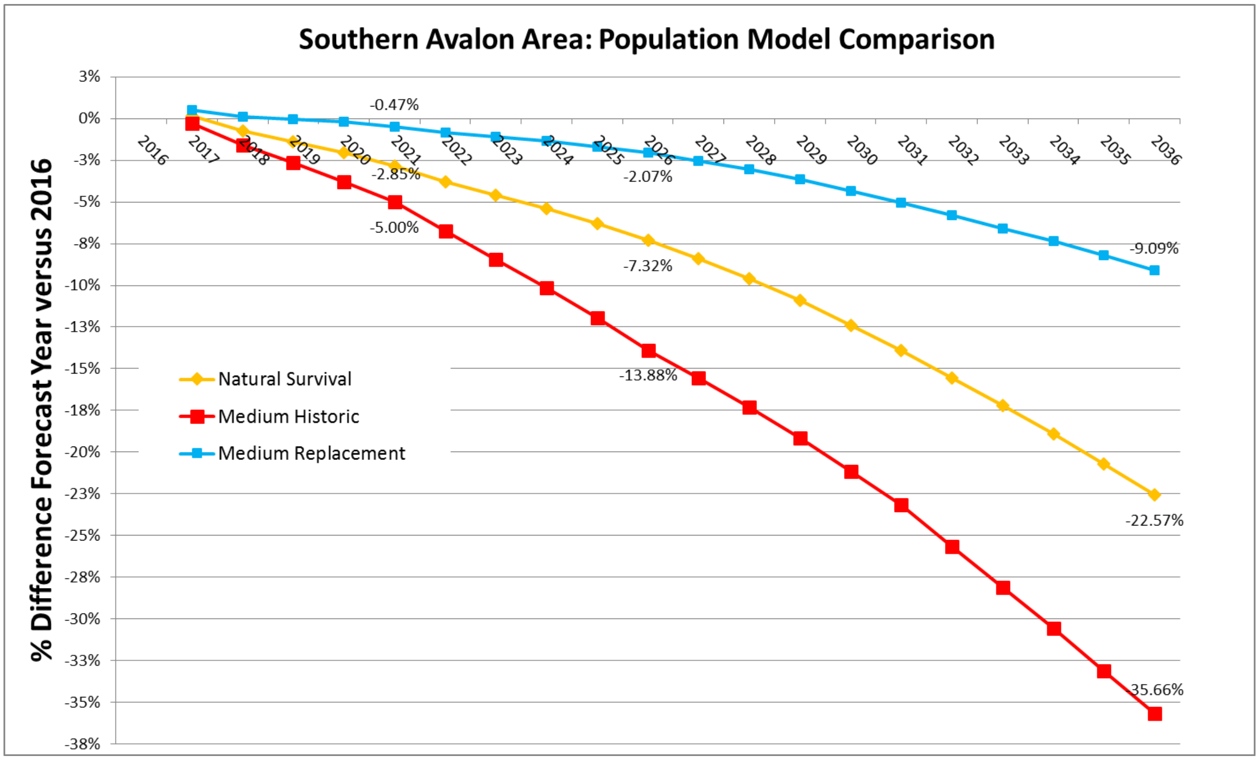


Figure 3.60: **Southern Avalon Area: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

The 2016 and 2036 age structures presented in Figure 3.61 are very similar to those for the Placentia - Point Lance Area. Out-migration still characterizes those in cohorts under the age of 45, there are significant losses in numbers in the 50-70 cohorts, but the largest numbers that remain are in the cohorts between 70 and 85. The outcome from the Medium HS model indicates that the average age will increase from 50 years in 2016 to 60 years by 2036.

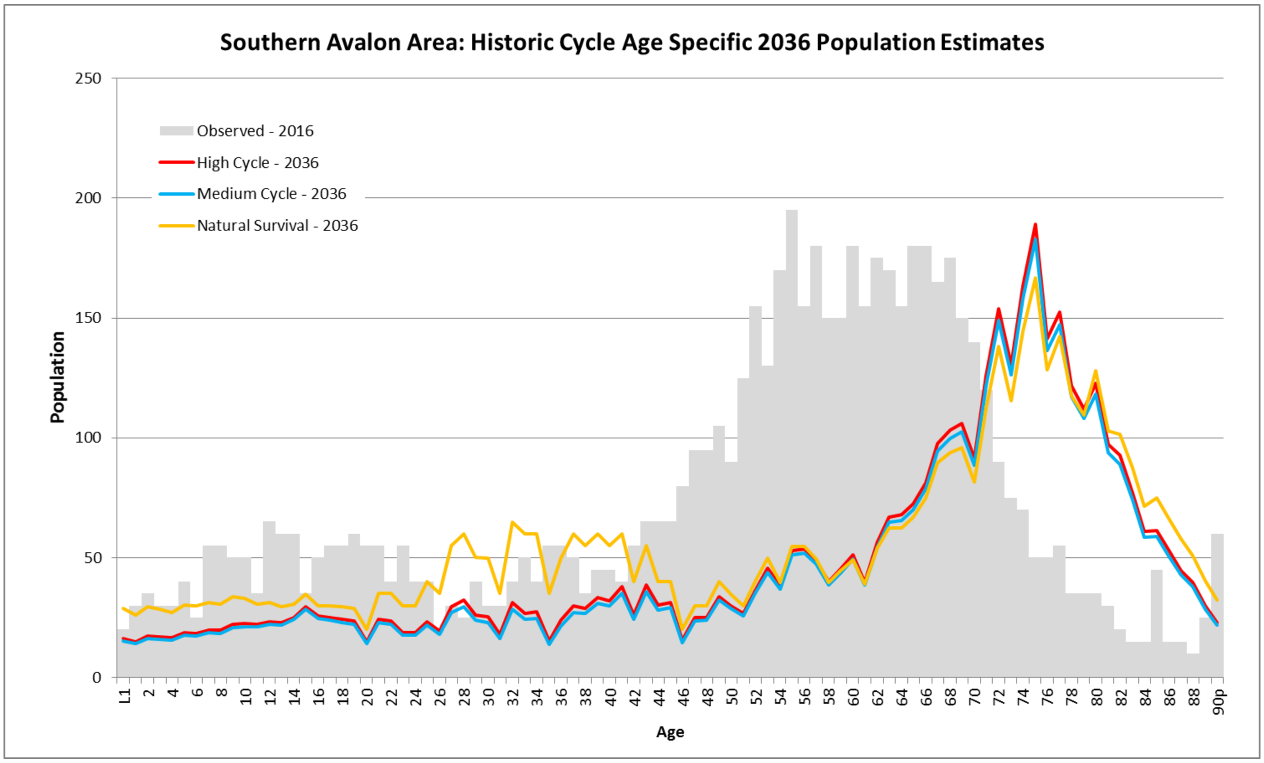


Figure 3.61: **Southern Avalon Area: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.22 North East Avalon Area

The 2016 baseline population for the North East Avalon Area (Figure 3.62) is 208,475.

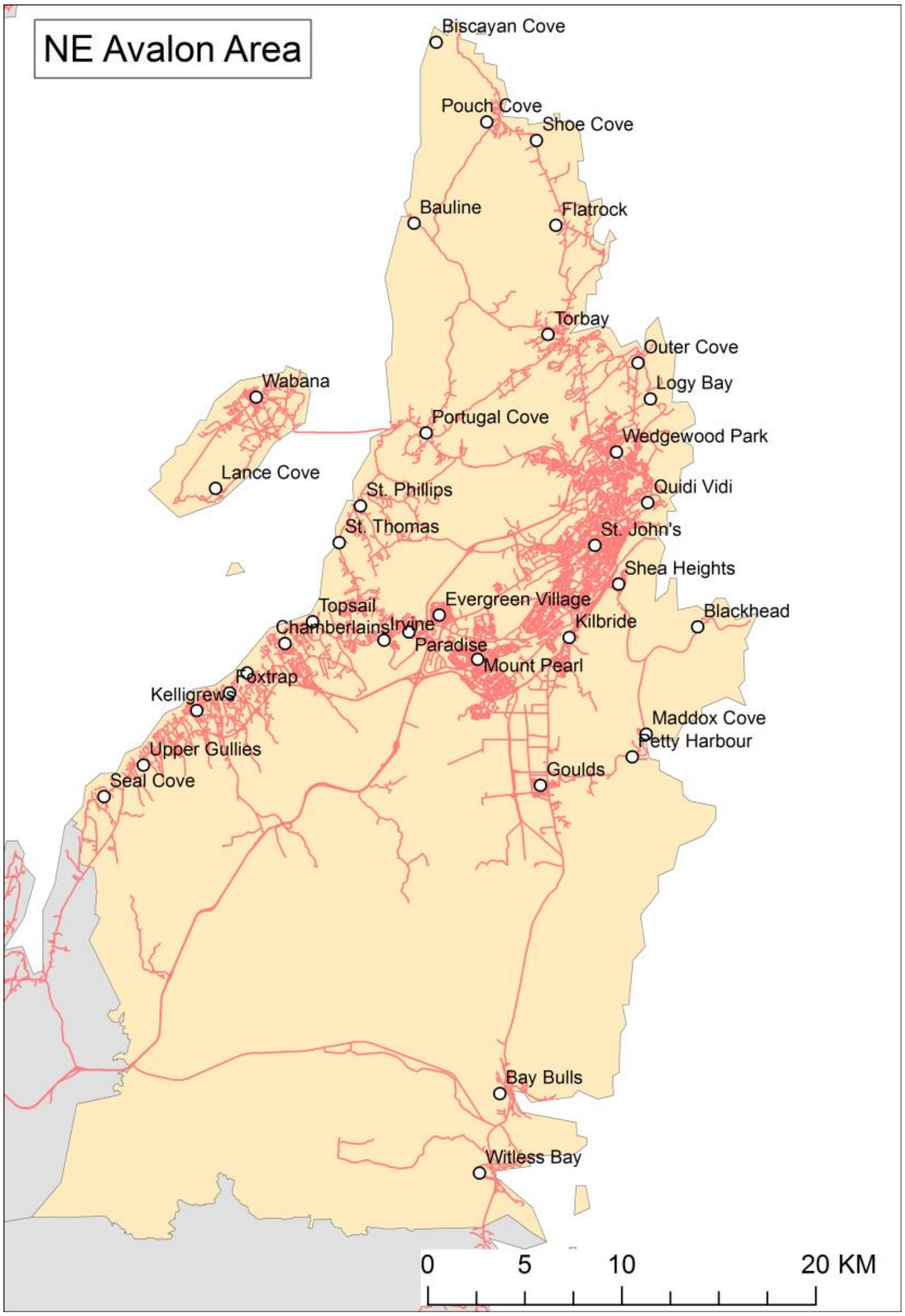


Figure 3.62: **North East Avalon Area.**

The most populated region of the province, the North East Avalon had a population of 208, 475 as of 2016. The NS model estimates a population of 199,973 by 2036, a decline indicating that birth rates were not high enough to offset death rates. However, the region is attractive to migrants and both the Medium HS model (240,336) and the High HS model (254,486) both project that population will increase (Table 3.21). For the same period, the RS model predicts population decreases under both the Low (204,750) and Medium (206,650) Replacement scenarios, but a small increase (209,500) under the High scenario. In-migration is the driver of population increase in the region, the only region on the Island of Newfoundland where this is projected to happen.

Table 3.21: **North East Avalon Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	208475	208475	208475	208475	208475	208475
2017	207926	210414	210414	208105	208192	208323
2018	208253	213250	213250	208591	208765	209028
2019	208522	216053	216053	209000	209264	209660
2020	208723	218813	218813	209327	209682	210214
2021	208877	221550	221550	209597	210043	210713
2022	208965	223028	224253	209799	210338	211146
2023	208996	224450	226933	209943	210575	211524
2024	208924	225776	229545	209996	210723	211813
2025	208758	227015	232100	209970	210792	212025
2026	208506	228178	234604	209878	210796	212173
2027	208152	230457	237038	209712	210726	212248
2028	207667	232633	239363	209447	210559	212226
2029	207053	234700	241574	209090	210299	212112
2030	206320	236669	243680	208651	209957	211918
2031	205495	238568	245709	208156	209561	211669
2032	204567	239138	247639	207593	209096	211352
2033	203553	239614	249495	206976	208579	210983
2034	202416	239928	251209	206266	207968	210520
2035	201215	240160	252866	205519	207320	210021
2036	199973	240336	254486	204750	206650	209500

Note: Table row values for **Year 2016** is the baseline population for the survival model estimates

The role of in-migration is clearly illustrated in Figure 3.63. The NS model projects a population loss of 4.08% by 2036 compared with a 15.28% increase under the Medium HS scenario. Replacing 70% of the labour force lost to retirement, etc. would not stabilize the population; a 0.88% decrease is expected by 2036. However, as noted above, a 100% replacement scenario would generate a 0.5% increase during the projection period.

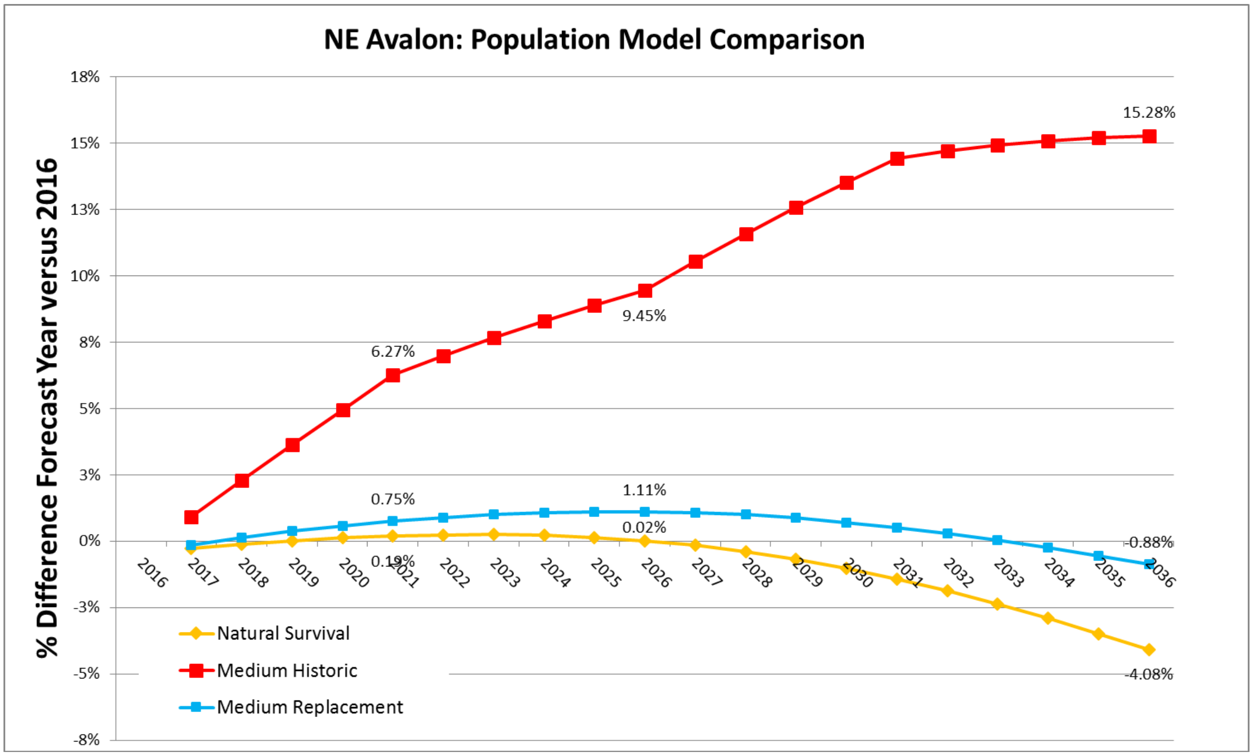


Figure 3.63: **North East Avalon Area: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

The 2016 observed population for the NE Avalon area as well as the projected NS and HS age structures for 2036 are presented in Figure 3.64. This figure again shows the importance of in-migration to the growth of the region, but it also illustrates that much of this new growth is associated with in-migration of those in age cohorts 36 and older. In this region, as well, the population will show aging characteristics. For example, the average age in 2016 was 40 years. The Medium HS results indicate that this will increase to 44 years by 2036.

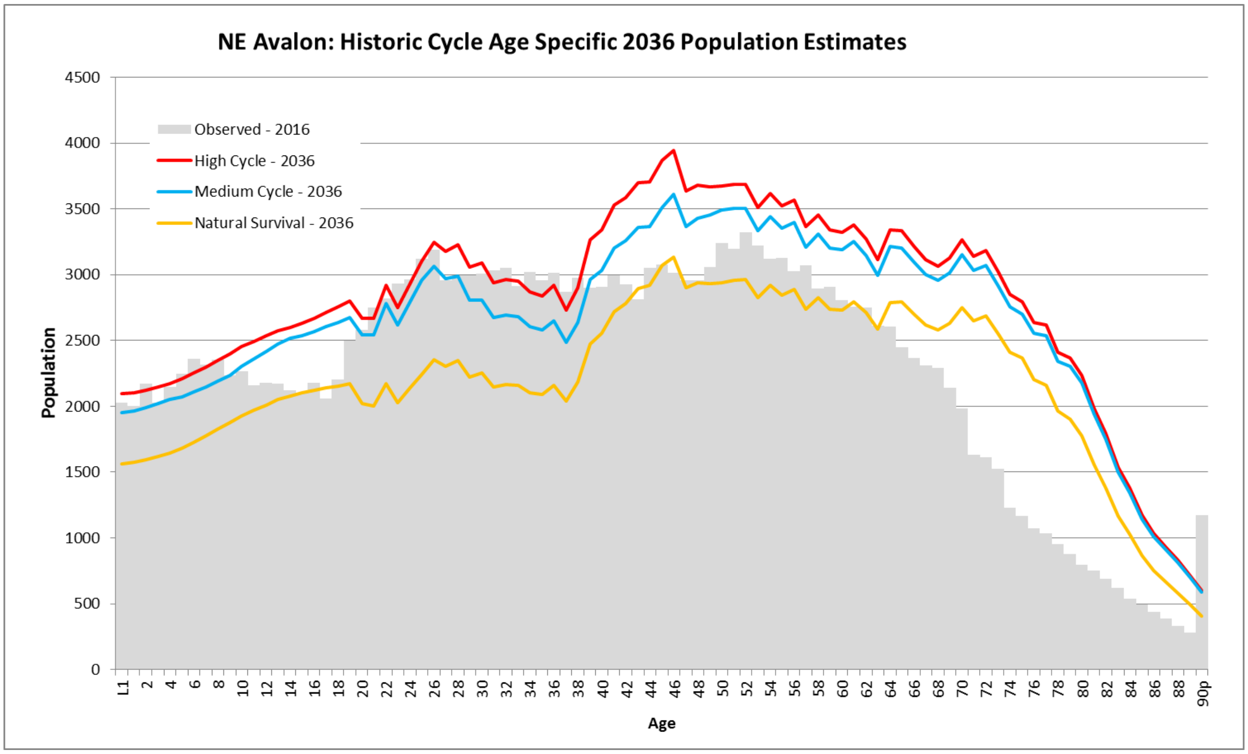


Figure 3.64: **North East Avalon Area: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.23 Labrador

Population projections for Labrador and its regions were published in an earlier report, *Regional Population Projections for Labrador and the Northern Peninsula 2016-2036*, by Alvin Simms and Jamie Ward, RAnLab, Memorial University (www.mun.ca/harriscentre/population project). The following projections use more recent baseline data and provide updated projections for the same time period, 2016-2036.

The 2016 population for Labrador as a whole was 27,105 (Table 3.22). High birth rates for the region as a whole and the relatively young population (compared with the Island portion of the province), would see an increase in the population under the NS model to 29,143 by 2036. However, out-migration has a significant impact on overall population levels and the HS model, which includes migration trends, indicates that the population would decline to 25,292 (Medium scenario) and 26,738 (High scenario) by 2036. Under the Replacement Model (RS) assumptions all scenarios would see overall increases in population to 28,618 (Low scenario) to 28,798 (High scenario).

Table 3.22: **Labrador Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	27105	27105	27105	27105	27105	27105
2017	27377	27275	27275	27371	27375	27380
2018	27577	27375	27375	27565	27572	27582
2019	27769	27467	27467	27744	27754	27770
2020	27944	27541	27541	27902	27916	27936
2021	28097	27594	27594	28036	28053	28079
2022	28248	27494	27645	28162	28183	28214
2023	28393	27386	27687	28279	28303	28340
2024	28515	27258	27708	28375	28403	28445
2025	28618	27103	27701	28450	28481	28529
2026	28721	26945	27690	28520	28555	28608
2027	28804	26907	27657	28573	28612	28670
2028	28876	26853	27606	28614	28656	28720
2029	28948	26789	27546	28649	28695	28764
2030	29013	26714	27474	28675	28725	28800
2031	29057	26617	27380	28686	28740	28820
2032	29097	26379	27282	28694	28752	28837
2033	29126	26124	27166	28691	28751	28843
2034	29138	25855	27033	28675	28739	28836
2035	29148	25579	26892	28652	28720	28822
2036	29143	25292	26738	28618	28690	28798

Note: Table row values for **Year 2016** is the baseline population for the survival model estimates

These trends are further illustrated in Figure 3.65. Under the NS model the population would increase by 7.52% over the 2016-2036 time period. However, when migration is considered, the population for the total area would decline by 6.69%. This could be offset by a successful replacement strategy. As illustrated under the Medium scenario RS model the population would increase by 5.85% and under the High scenario (Table 3.22) by 6.25%.

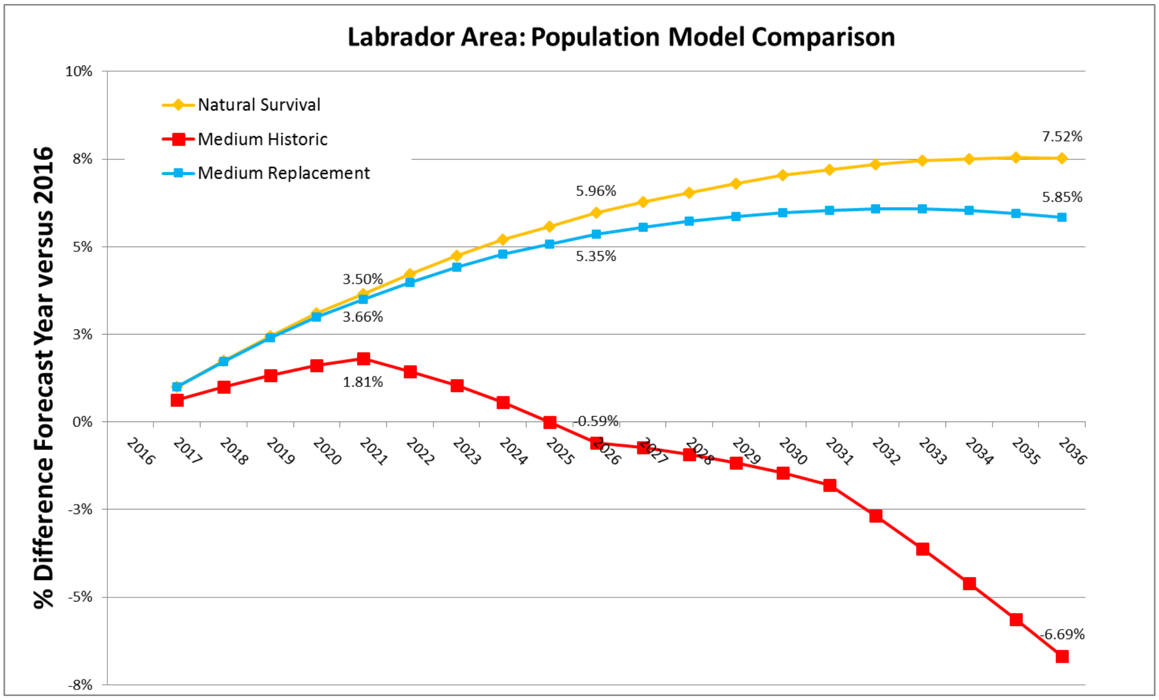


Figure 3.65: **Labrador: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

The current (2016) and projected (2036) age structures for Labrador are illustrated in Figure 3.66. The relatively high birth rates and low death rates would help to maintain population levels, but out-migration among age cohorts less than 15 and between 18 and 45 are the main contributors to population decreases. The aging of the population is also significant with a large increase in the numbers in cohorts 58 and older. The average age for Labrador residents as a whole is expected to increases from 37 in 2016 to 45 by 2036.

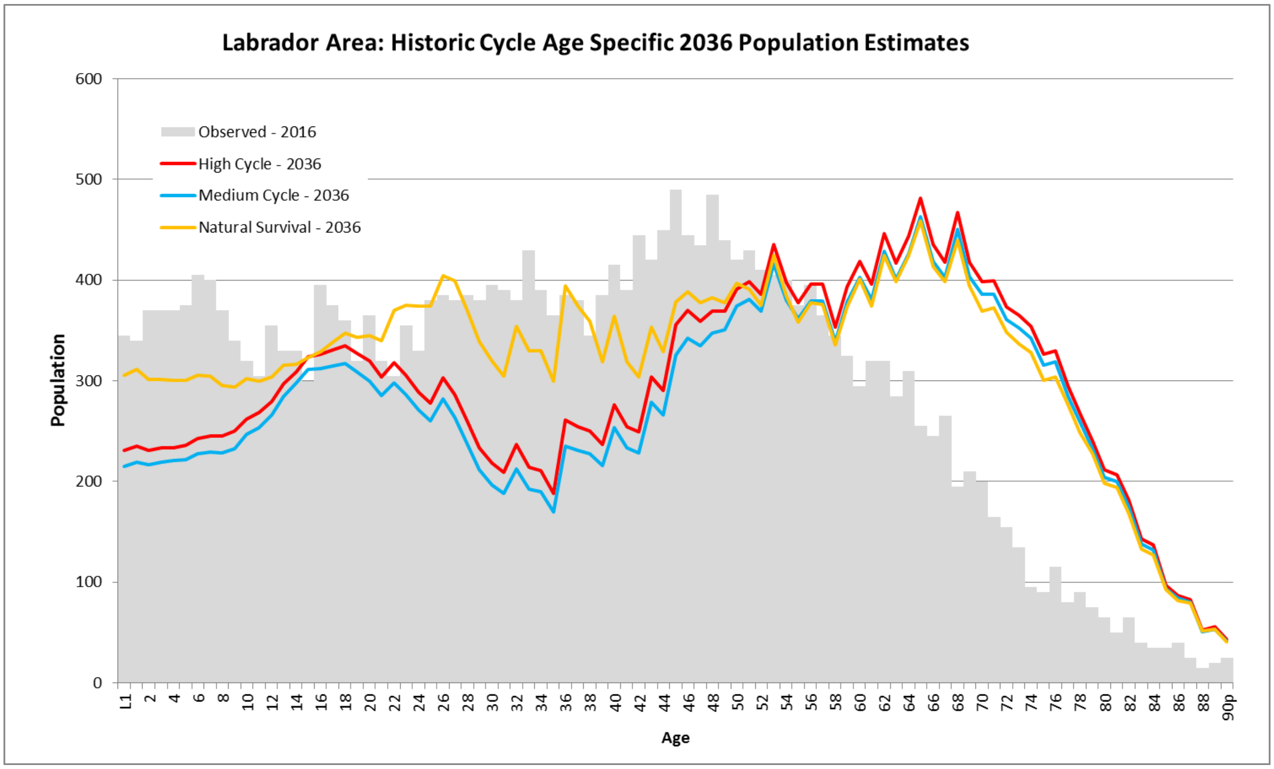


Figure 3.66: **Labrador: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.24 Labrador North Coast

The 2016 baseline population for the Labrador North Coast Area (Figure 3.67) is 3,220.

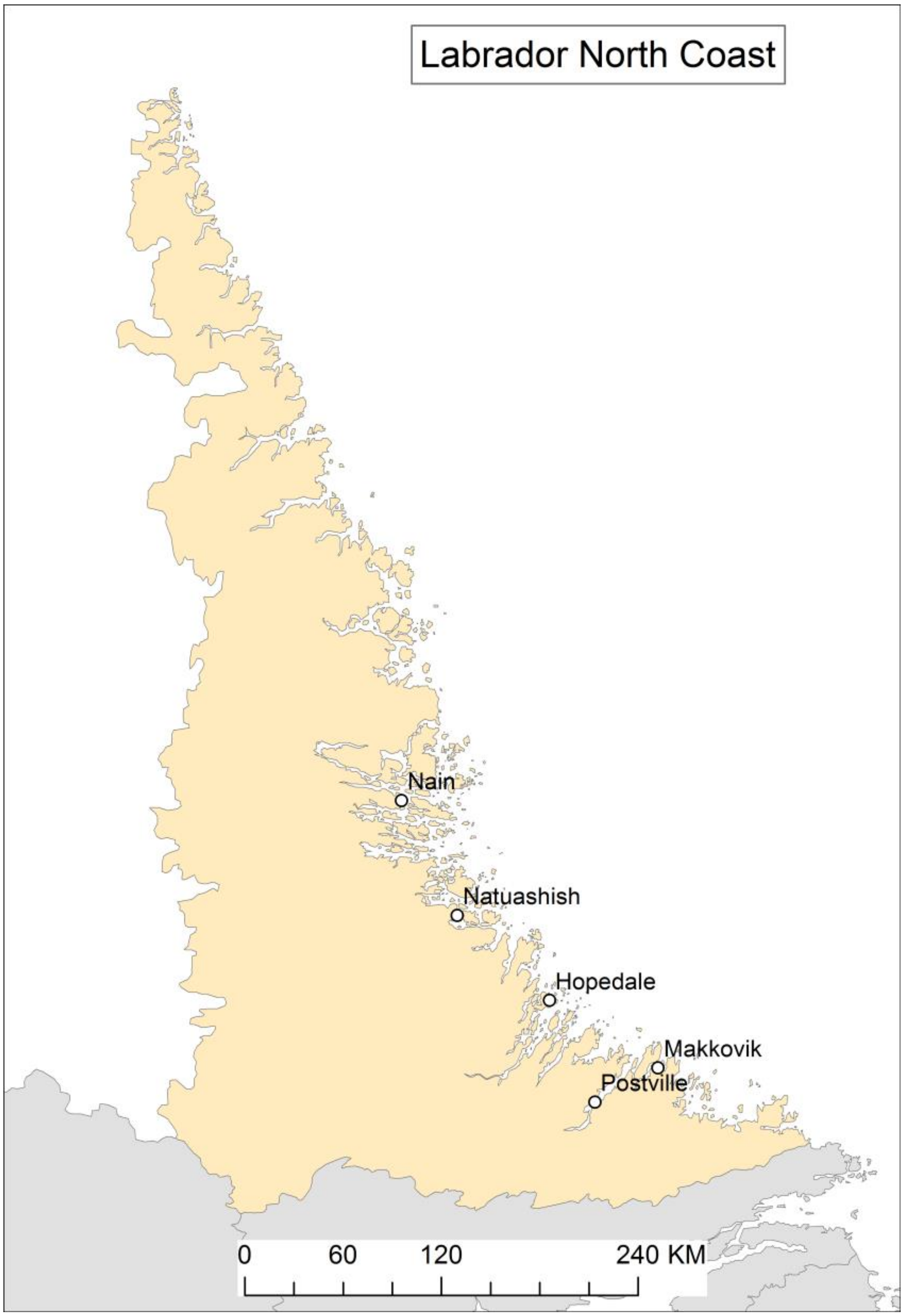


Figure 3.67: **Labrador North Coast Area.**

The population of this area would increase over the projection period under the NS model to 3,884 as birth rates in the region remain high. However, out-migration would offset this and the estimated populations under the Medium and High HS models indicate that the population would decline to 2,514 and 2,665 respectively by 2036. Replacing the workforce would, however, see the population increasing under the Low RS model to 3,491 and under the High RS model to 3,615 (Table 3.23).

Table 3.23: **Labrador North Coast Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	3220	3220	3220	3220	3220	3220
2017	3278	3220	3220	3264	3268	3270
2018	3321	3206	3206	3294	3301	3306
2019	3360	3188	3188	3318	3329	3336
2020	3400	3169	3169	3342	3356	3365
2021	3438	3148	3148	3363	3380	3392
2022	3478	3110	3128	3382	3404	3418
2023	3513	3068	3104	3399	3424	3440
2024	3543	3022	3075	3411	3439	3459
2025	3576	2977	3047	3423	3456	3477
2026	3609	2932	3018	3435	3471	3495
2027	3640	2900	2986	3444	3484	3511
2028	3667	2866	2951	3451	3495	3524
2029	3691	2830	2914	3457	3504	3536
2030	3723	2797	2880	3465	3516	3550
2031	3749	2762	2844	3470	3525	3562
2032	3777	2712	2809	3476	3535	3574
2033	3807	2663	2775	3482	3545	3587
2034	3830	2611	2737	3485	3551	3596
2035	3856	2562	2700	3488	3559	3606
2036	3884	2514	2665	3491	3566	3615

Note: Table row values for **Year 2016** is the baseline population for the survival model estimates

As Figure 3.68 illustrates, the NS model indicates a 20.64% increase over the projection period. However, when migration is included high levels of projected out-migration offset these gains and the total population is anticipated to decline by 21.93%. Labour force replacement would offset out-migration – a replacement of 70% would see a population increases of 10.74%, but developing employment opportunities on the Labrador North Coast to achieve these replacement numbers will be a very challenging task.

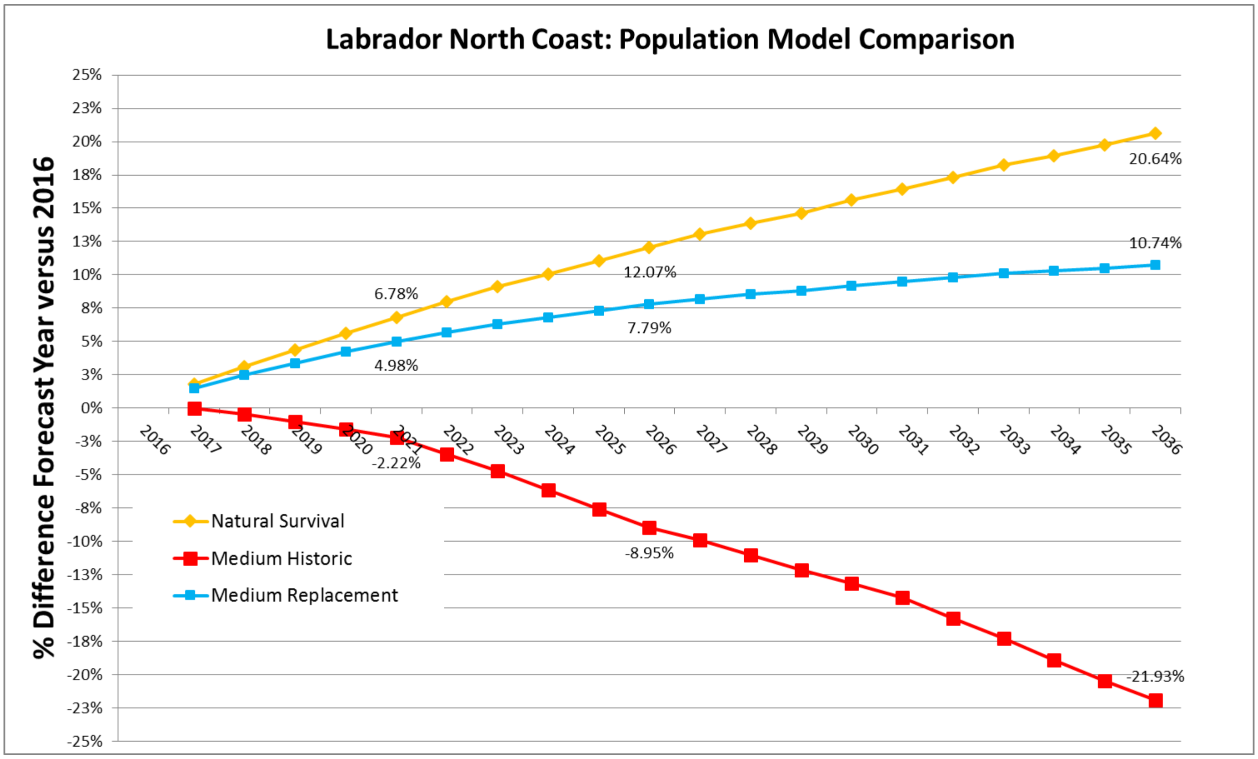


***Figure 3.68:* Labrador North Coast: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

The age structures for 2016 and 2036 illustrated in Figure 3.69 suggest dramatic changes from year-to-year age cohorts, but this is primarily a function of the small numbers involved and the scale at which these are shown. What is evident is the high level of out-migration, particularly of those under 50 years of age, and the increase in the numbers of those in age cohorts over 50. The average age of the population in this area is expected to increase from 31 in 2016 to 42 by 2036.

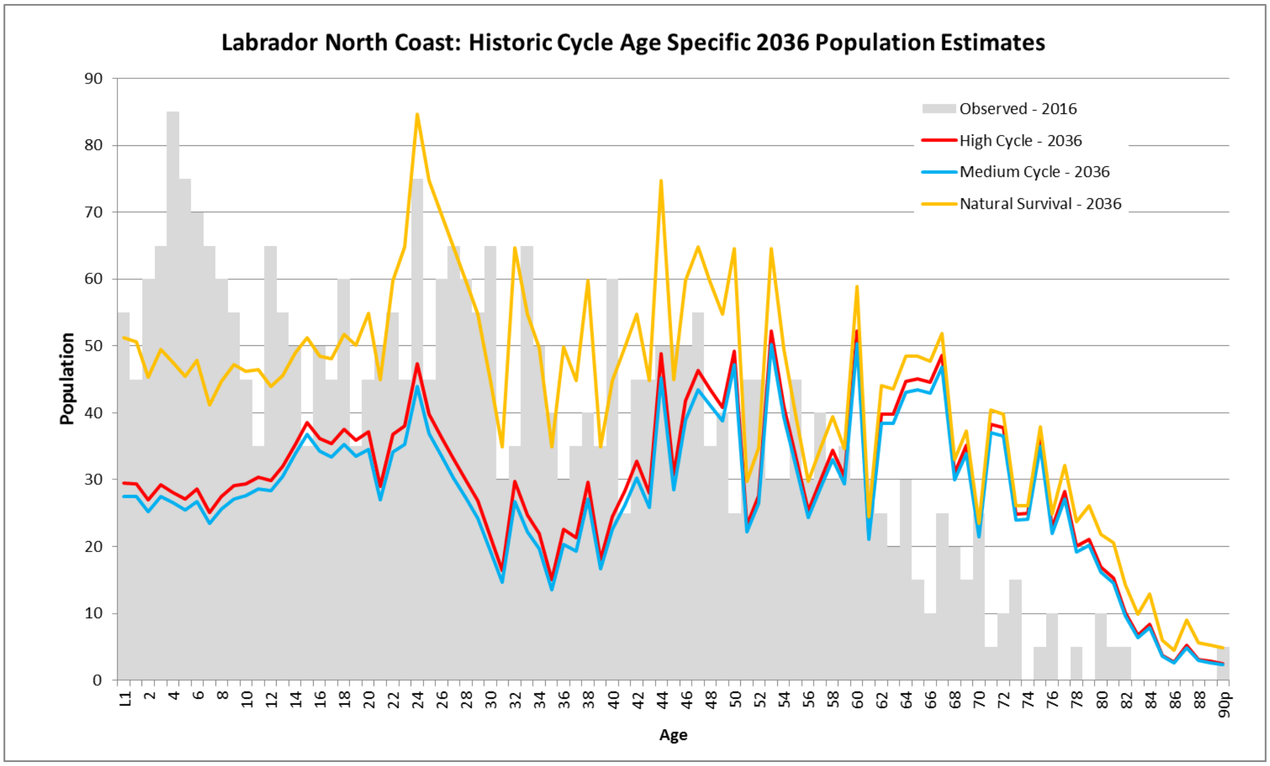


Figure 3.69: **Labrador North Coast: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.25 Central Labrador Area

The 2016 baseline population for the Central Labrador Area (Figure 3.70) is 10,480.

Figure 3.70: **Central Labrador Area.**

The population of the Central Labrador Area (Figure 3.70) was 10,480 in 2016 and under the assumptions of the NS model this would increase to 11,252 by 2036 (Table 3.24) given comparatively high birth rates in the region. This increase is expected to be offset by out-migration, with the Medium scenario HS model indicating a small decrease in the population to 10,414 by 2036 and the High scenario an increase to 11,019. Unlike almost all other regions in the province the total population of this area is expected to remain relatively stable over the projection period, and if a replacement strategy could be successfully implemented the total population could increase to 10,948 and 10,981 under the Low and High RS model scenarios respectively.

***Table 3.24:* Central Labrador Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	10480	10480	10480	10480	10480	10480
2017	10559	10560	10560	10557	10558	10559
2018	10637	10639	10639	10630	10631	10633
2019	10711	10714	10714	10696	10698	10701
2020	10780	10781	10781	10754	10756	10760
2021	10841	10840	10840	10802	10805	10810
2022	10904	10842	10902	10850	10854	10860
2023	10962	10838	10958	10892	10897	10903
2024	11013	10826	11007	10927	10933	10940
2025	11054	10799	11041	10951	10957	10965
2026	11095	10771	11073	10974	10980	10990
2027	11129	10792	11097	10989	10996	11007
2028	11156	10804	11111	10998	11006	11018
2029	11181	10810	11121	11005	11013	11026
2030	11200	10809	11122	11006	11015	11029
2031	11217	10802	11117	11004	11014	11028
2032	11232	10736	11110	11001	11012	11027
2033	11243	10662	11094	10993	11004	11021
2034	11248	10582	11072	10981	10993	11010
2035	11254	10501	11049	10967	10980	10998
2036	11252	10414	11019	10948	10961	10981

Note: Table row values for **Year 2016** is the baseline population for the survival model estimates

These projected changes are further illustrated in Figure 3.71. The NS model projection indicates an increase of 7.37% over the projection period, the Medium HS scenario a decrease of 0.68% and the Medium RS scenario model an increase of 4.59%.

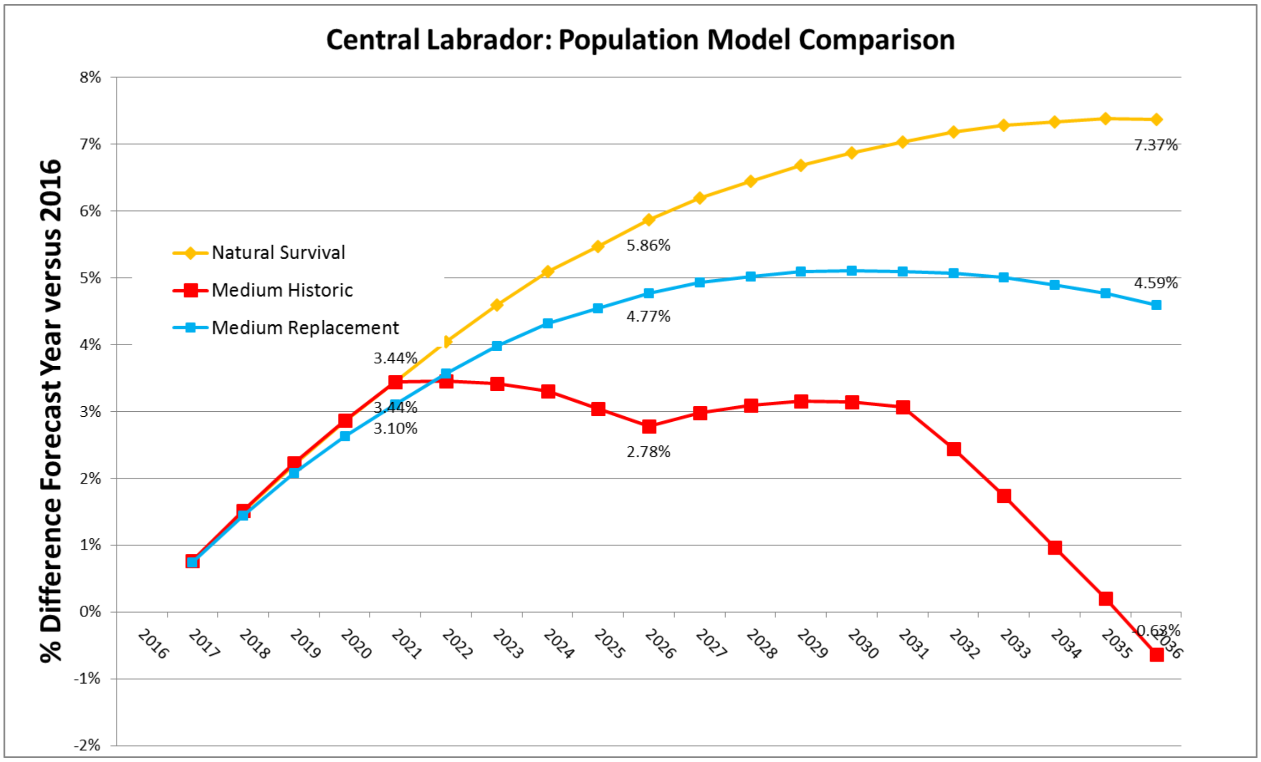


Figure 3.71: **Central Labrador: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

Relative overall population stability notwithstanding, Figure 3.72 illustrates population losses in those age cohorts under 12 years and in those between 24 and 44 in particular. The increase in the number of people in cohorts over the age of 60 is also evident and the average age of the population in the area is expected to increase from 36 in 2016 to 44 in 2036.

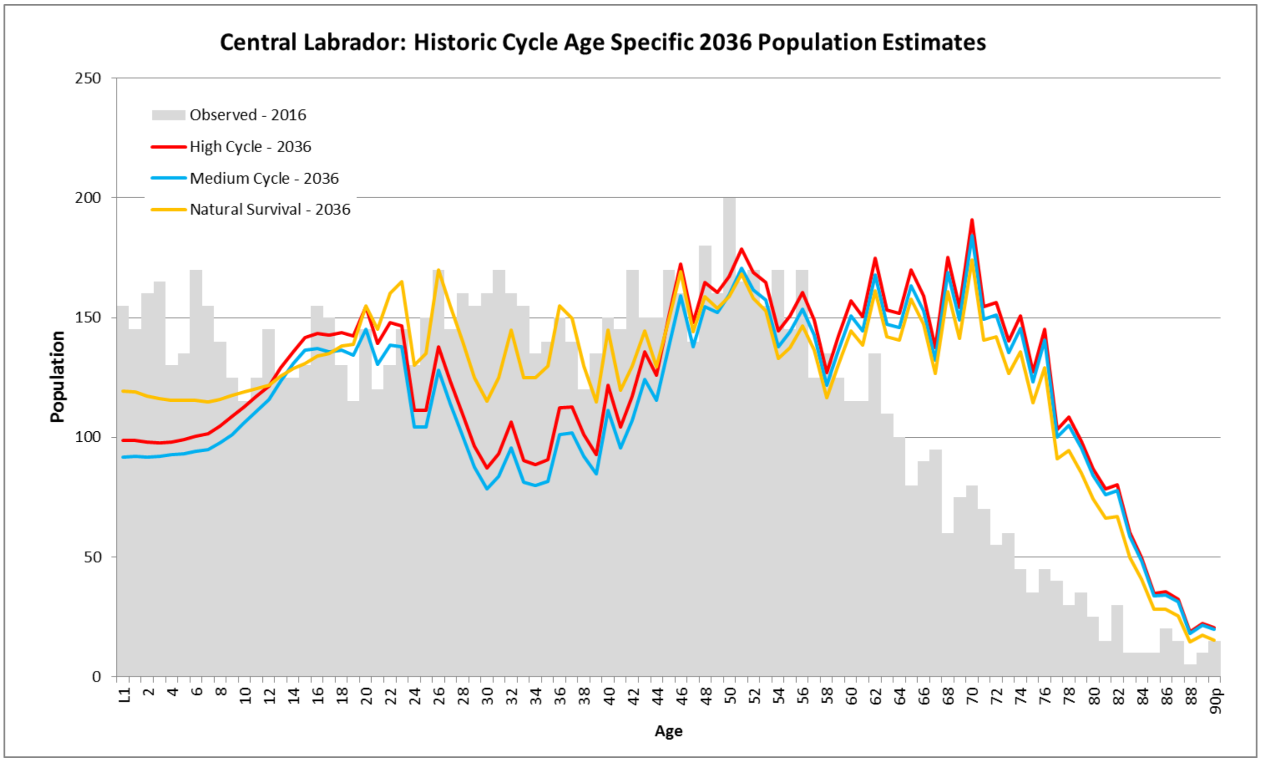


Figure 3.72: **Central Labrador: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.26 Labrador West Area

The 2016 baseline population for the Labrador West Area (Figure 3.73) is 9,870.

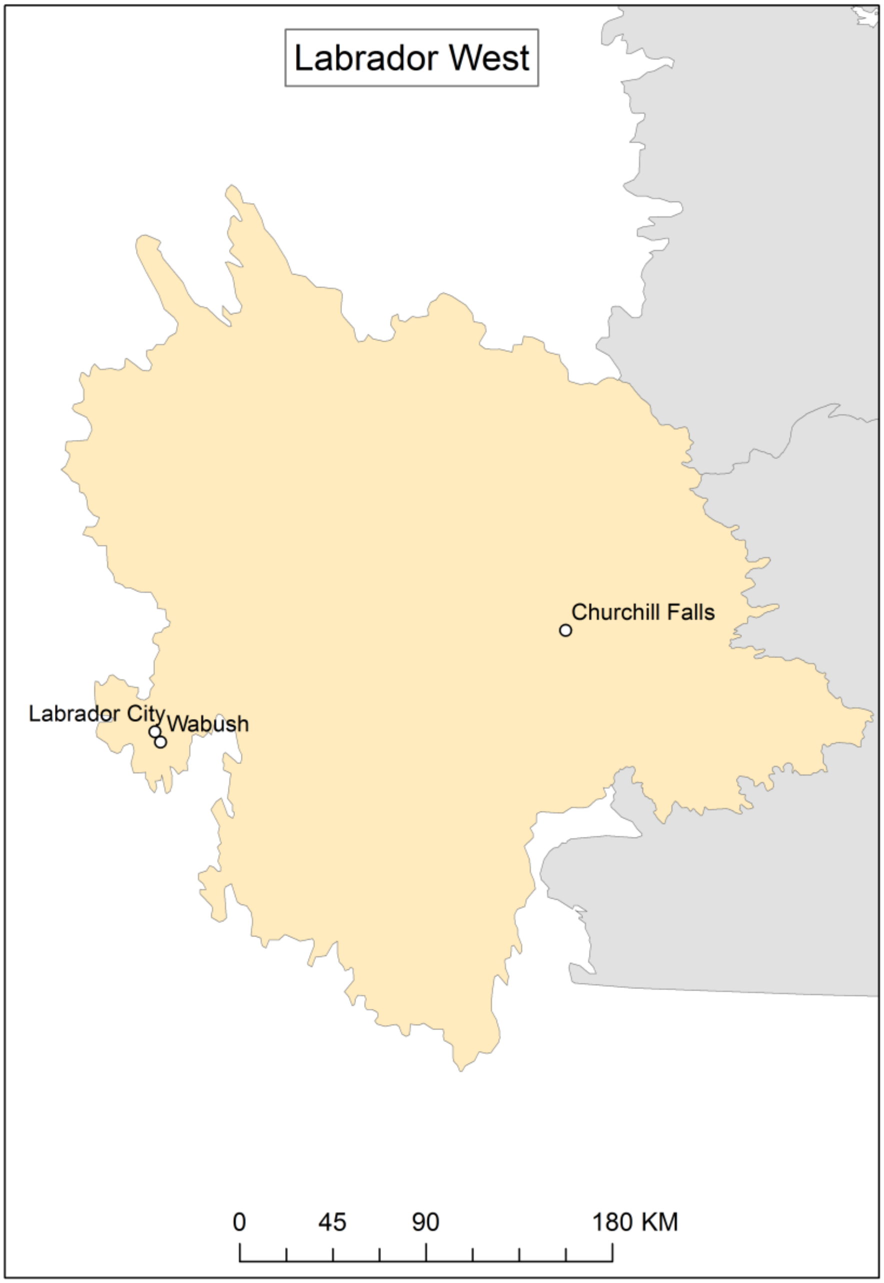


Figure 3.73: **Labrador West Area.**

The population of the Labrador West Area (Figure 3.73) is projected to increase from 9,870 in 2016 to 10,669 by 2036 under the NS model (Table 3.25). As a region where the economy is driven primarily by the state of world iron ore markets, migration is perhaps more difficult to anticipate than for many other regions, but based on recent past trends the Medium and High HS scenario models project modest increases to 9,934 and 10,502 respectively by 2036. Replacement of labour lost to retirement, out-migration, etc., would again see the total population increase somewhat to 10,484 under the Low scenario RS model and 10,587 under the High scenario.

Table 3.25: **Labrador West Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	9870	9870	9870	9870	9870	9870
2017	9964	9966	9966	9965	9967	9970
2018	10045	10049	10049	10045	10049	10055
2019	10120	10126	10126	10117	10123	10132
2020	10192	10199	10199	10184	10191	10203
2021	10257	10265	10265	10242	10252	10267
2022	10320	10271	10328	10297	10309	10327
2023	10378	10272	10385	10345	10359	10380
2024	10433	10269	10439	10390	10406	10430
2025	10478	10253	10480	10424	10442	10469
2026	10518	10232	10515	10453	10473	10503
2027	10555	10258	10544	10477	10500	10533
2028	10585	10275	10564	10495	10520	10556
2029	10608	10284	10576	10507	10534	10574
2030	10629	10288	10582	10516	10545	10588
2031	10646	10285	10581	10520	10550	10597
2032	10661	10228	10579	10522	10555	10605
2033	10671	10164	10569	10520	10555	10607
2034	10677	10094	10555	10513	10550	10606
2035	10675	10016	10530	10500	10539	10598
2036	10669	9934	10502	10484	10525	10587

Note: Table row values for **Year 2016** is the baseline population for the survival model estimates

These projections are further illustrated in Figure 3.74 in which the population under the NS Model assumptions would increase by 8.09% by 2036, but ultimately decline by 0.65% under the Medium HS model assumptions because of out-migration. A replacement strategy could help maintain or increase the population. Under the Medium (70%) RS model assumptions the population would increase by 6.64%. Given the nature of the economic base of the region and the opportunities that arise when mineral prices are good, a replacement process is perhaps more likely to be successful here than in other regions of the province.

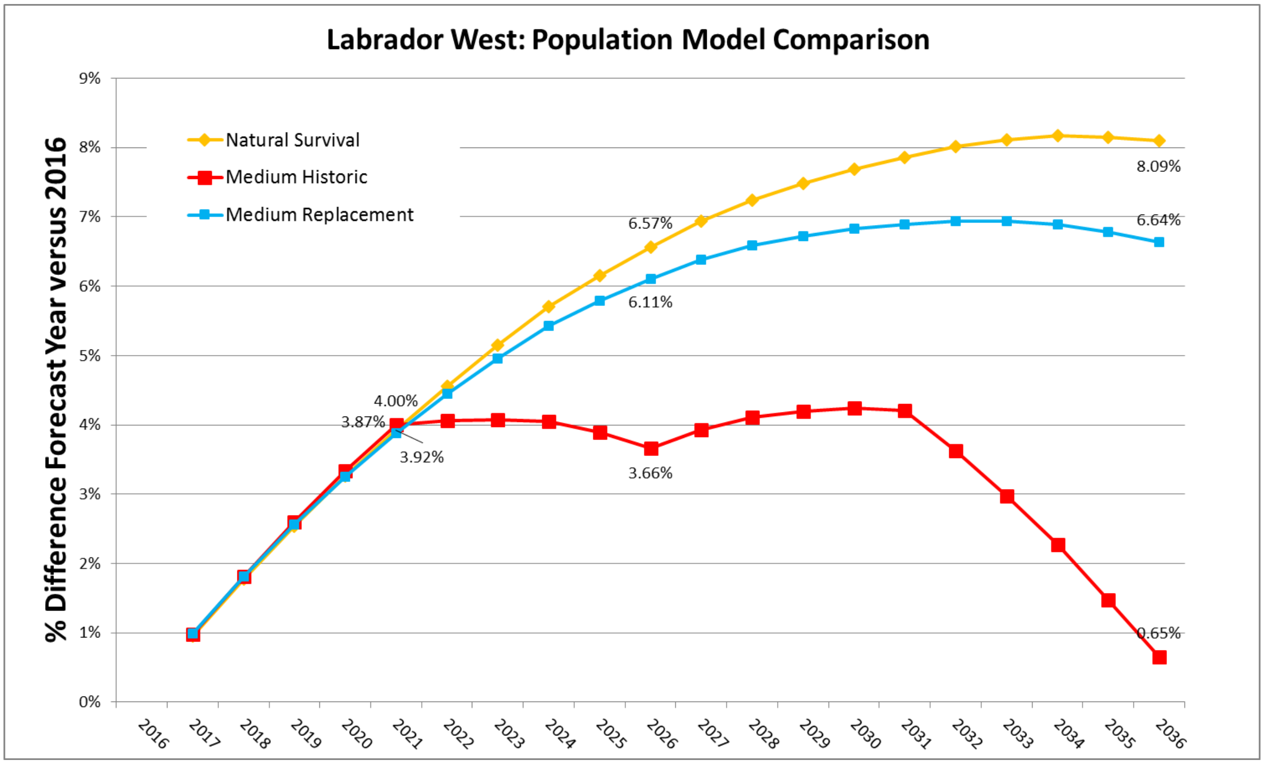


Figure 3.74: **Labrador West: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

As with the Central Labrador Area projections the age structure for Labrador West (Figure 3.75) indicates losses from outmigration in the youngest cohorts, those under 12 years of age, and in those between 20 and 50. Similarly there is a significant increase in the number of those in the 50+ age cohorts; the average age of the population in this region is projected to increase from 36 in 2016 to 45 by 2036 if the assumptions of the models are maintained.

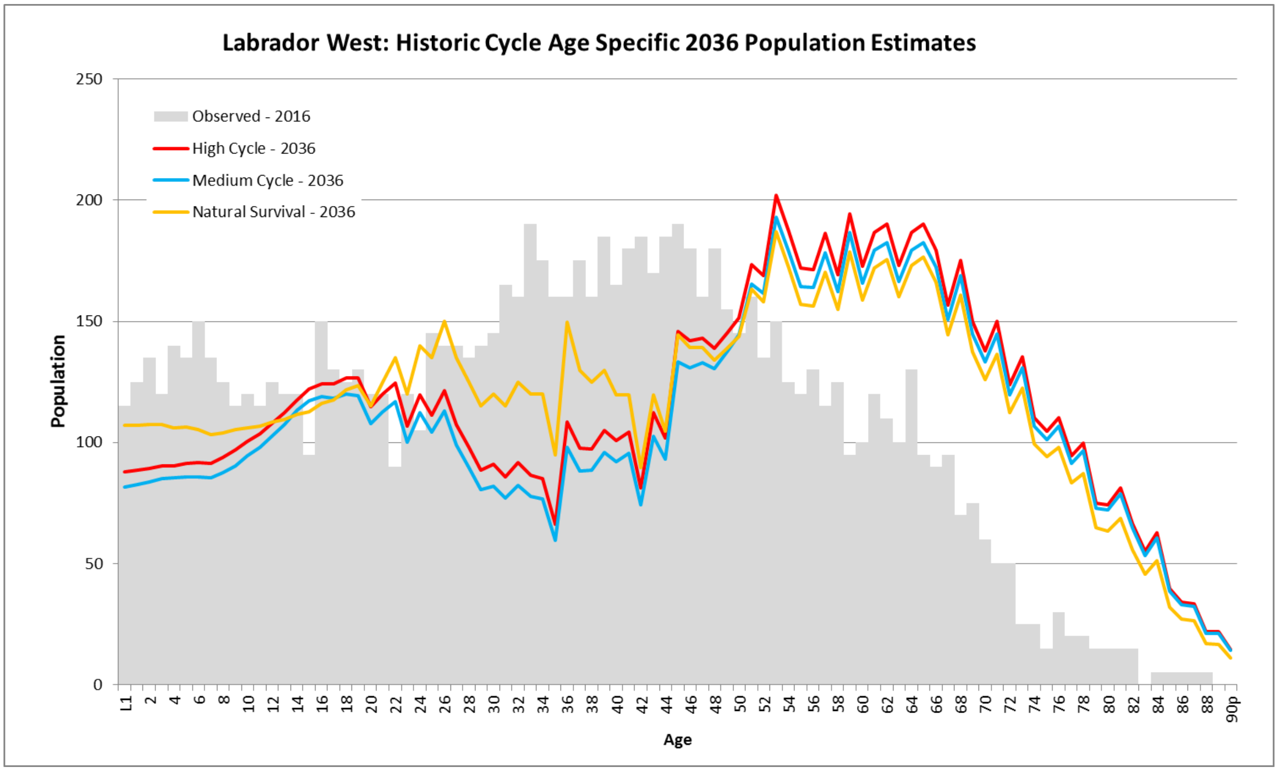


Figure 3.75: **Labrador West: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.27 Labrador South Coast Area

The 2016 baseline population for the Labrador South Coast Area (Figure 3.76) is 1,955.

Figure 3.76: **Labrador South Coast Area.**

The population of the Labrador South Coast Area (Figure 3.76) is projected to decline slightly under the NS model from 1,955 in 2016 to 1,939 by 2036 (Table 3.26). However, out-migration is expected to reduce the population to 1,348 under the Medium HS scenario and to 1,420 under the High scenario. Replacement could help stabilize or increase the population. Under the Low scenario RS model the population would increase to 2,066 and under the High scenario assumptions to 2,157 during the projection period.

Table 3.26: **Labrador South Coast Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	1955	1955	1955	1955	1955	1955
2017	1973	1944	1944	1975	1977	1979
2018	1976	1917	1917	1982	1985	1990
2019	1979	1893	1893	1990	1995	2003
2020	1984	1870	1870	1999	2006	2016
2021	1981	1841	1841	2002	2011	2024
2022	1976	1801	1811	2005	2015	2030
2023	1979	1768	1787	2013	2025	2043
2024	1978	1732	1759	2018	2032	2053
2025	1979	1697	1732	2024	2040	2063
2026	1979	1663	1706	2030	2048	2074
2027	1976	1635	1678	2034	2054	2083
2028	1977	1610	1653	2041	2062	2094
2029	1979	1586	1627	2047	2070	2105
2030	1978	1560	1601	2053	2078	2115
2031	1974	1531	1572	2056	2083	2123
2032	1966	1494	1542	2058	2087	2130
2033	1960	1458	1513	2061	2091	2137
2034	1952	1421	1482	2062	2095	2144
2035	1949	1386	1453	2065	2100	2151
2036	1939	1348	1420	2066	2102	2157

Note: Table row values for **Year 2016** is the baseline population for the survival model estimates

These projected changes are illustrated in Figure 3.77. Under the NS model the population shows a small decrease (0.81%), but when migration is included in the Medium HS scenario model the overall decrease is expected to be 31.06%. Under the Medium RS model the population is projected to increase by 7.53% by 2036.

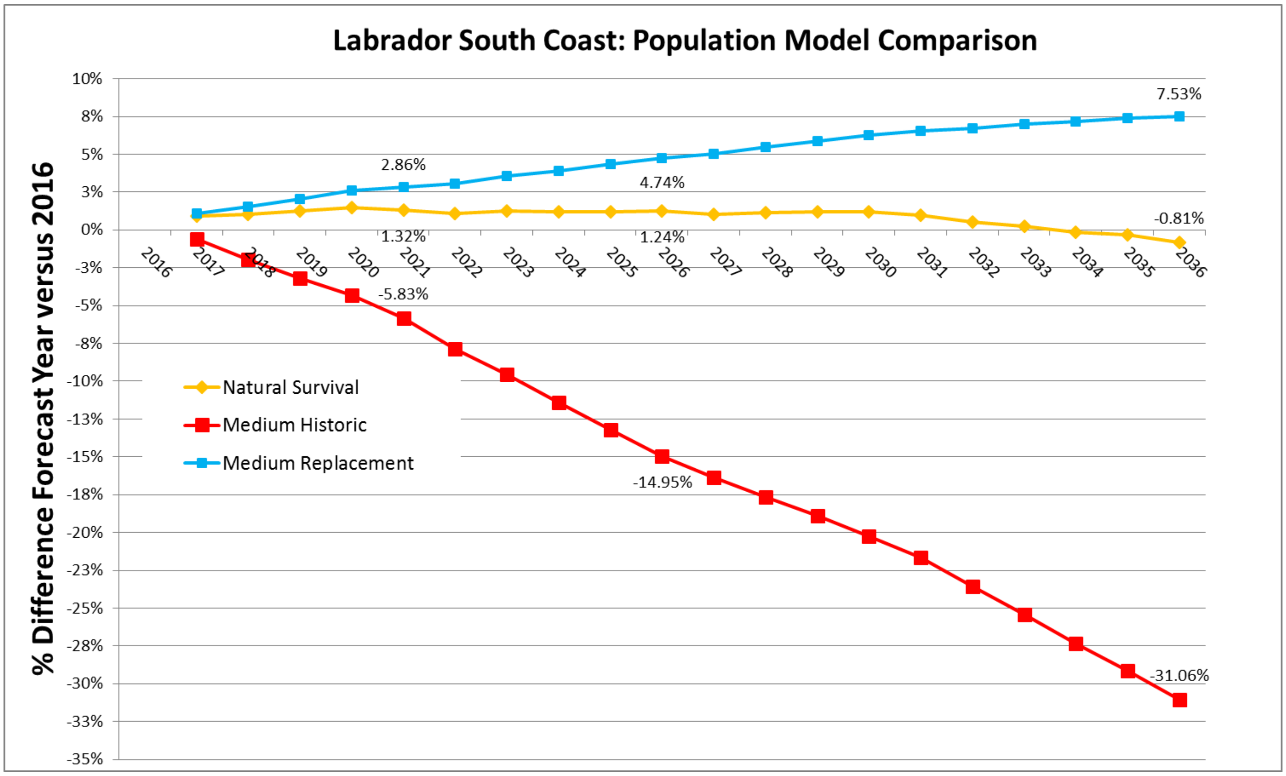


Figure 3.77: **Labrador South Coast: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

Figure 3.78 illustrates the age structure of the region for 2016 and 2036. Out-migration is associated with all age cohorts to some degree, but particularly those under 55. As with other regions there is an increase in the number of people in the older age cohorts (mainly 60+) and the average age of the population in the area is expected to increase from 43 in 2016 to 51 by 2036.

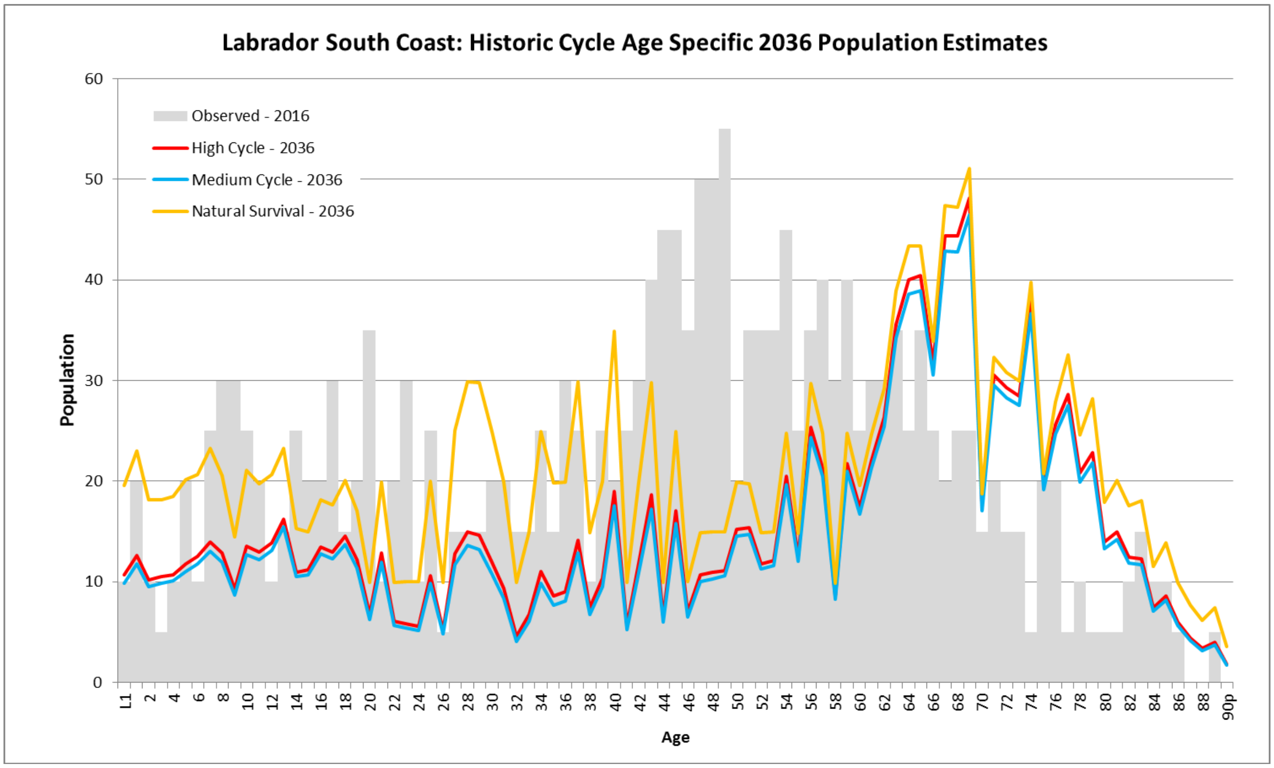


Figure 3.78: **Labrador South Coast: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

3.28 Labrador Straits Area

The 2016 baseline population for the Labrador Straits Area (Figure 3.79) is 1,580.

Figure 3.79: **Labrador Straits Area.**

The Labrador Straits Area had a population of 1,580 in 2016, which under the NS model is expected to decline to 1,398 by 2036 (Table 3.27). The projected decline is further emphasized when migration factors are included. Under the Medium scenario HS model the 2036 population is projected at 1,082 and at 1,131 for the High scenario. Replacement strategies could help to stabilize the population, but only if 100% of the "lost' labour force could be replaced.

Table 3.27: **Labrador Straits Area: Population Estimates 2016 to 2036 by Model Type.**

Year	Natural Survival	Historical (Cyclic) Survival Model		Replacement Survival Model		
		Medium Historic	High Historic	Low Replacement	Medium Replacement	High Replacement
2016	1580	1580	1580	1580	1580	1580
2017	1603	1586	1586	1604	1605	1607
2018	1598	1564	1564	1603	1606	1610
2019	1597	1547	1547	1605	1609	1616
2020	1589	1523	1523	1601	1607	1616
2021	1580	1500	1500	1597	1604	1615
2022	1571	1470	1476	1592	1601	1615
2023	1561	1440	1453	1588	1599	1614
2024	1547	1409	1428	1581	1593	1611
2025	1532	1377	1401	1574	1588	1608
2026	1520	1347	1377	1569	1584	1607
2027	1505	1323	1352	1562	1579	1604
2028	1492	1298	1327	1555	1573	1601
2029	1488	1280	1308	1553	1573	1603
2030	1483	1260	1289	1550	1571	1604
2031	1472	1237	1266	1545	1567	1602
2032	1461	1209	1242	1538	1563	1600
2033	1444	1177	1215	1530	1556	1595
2034	1431	1147	1189	1523	1550	1591
2035	1415	1115	1160	1514	1543	1587
2036	1398	1082	1131	1505	1536	1582

Note: Table row values for **Year 2016** is the baseline population for the survival model estimates

Figure 3.80 illustrates these projected changes. The NS model shows an overall decrease in population of 11.50% by 2036, the Medium scenario HS model a decrease of 31.51%, and the Medium scenario RS model a decrease of 2.79%.

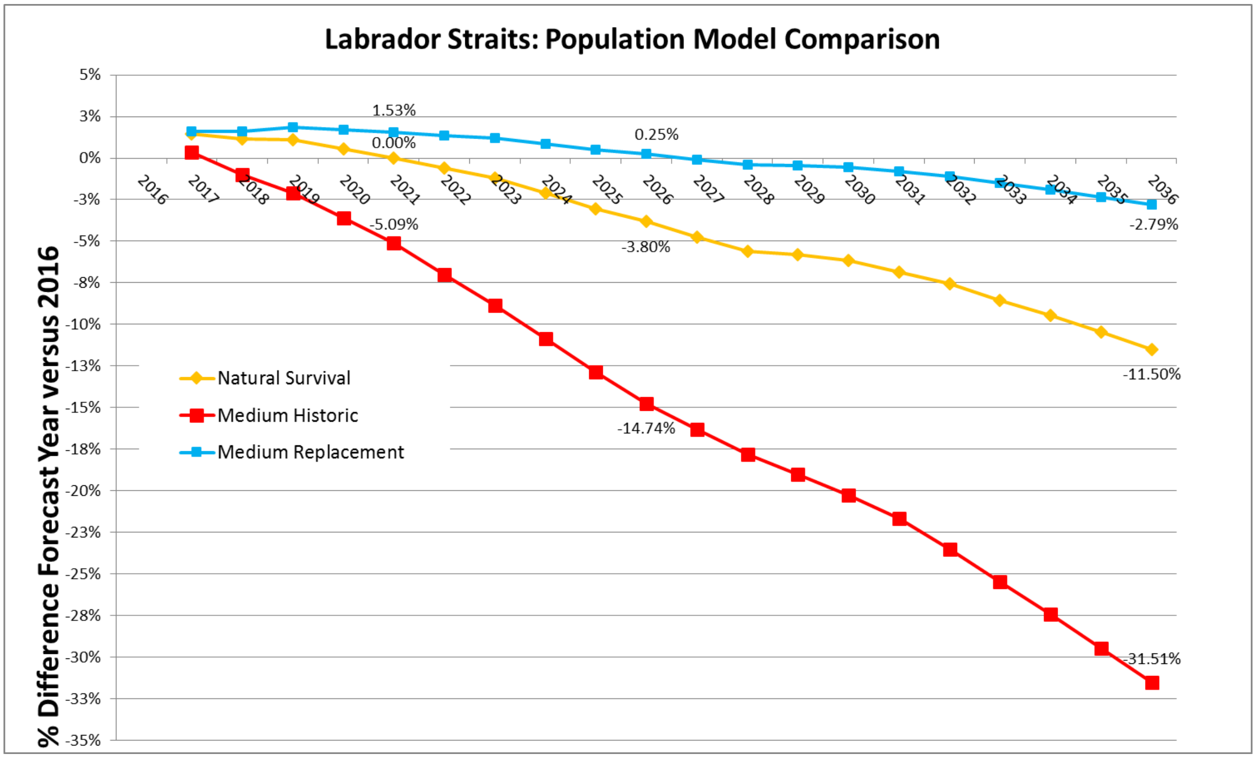


Figure 3.80: **Labrador Straits: Natural Survival, Historic Survival and Medium Replacement Models Predicted Percent Population Change (Baseline Year = 2016).**

The age structure for the Straits Area for 2016 and 2036 is illustrated in Figure 3.81. Out-migration characterizes those age cohorts up to age 52, after which there is relatively little out-migration until the 80+ groups. The major losses of population are projected to be in the 40-64 age categories and, as elsewhere, the average age of the population ii expected to increase from 48 in 2016 to 55 in 2036.

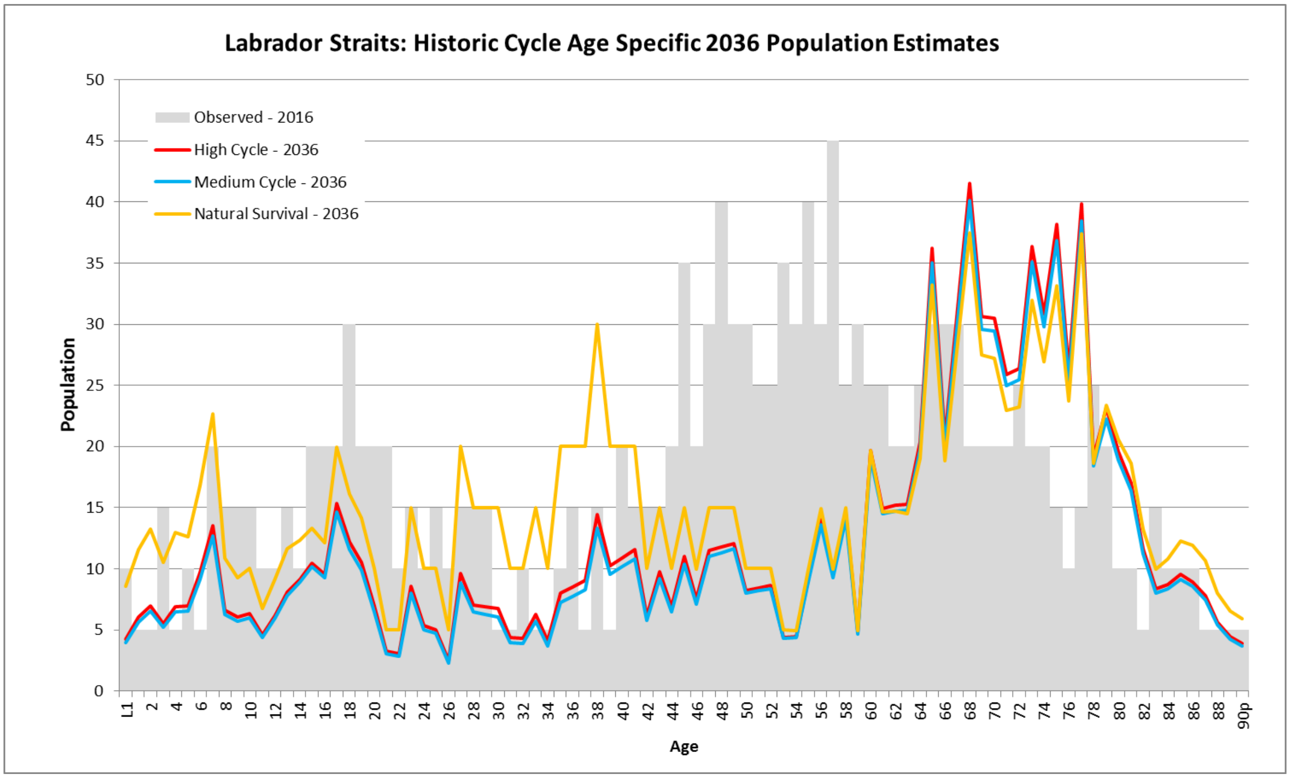


Figure 3.81: **Labrador Straits: Observed versus Natural and Historic Survival Models 2036 Predicted Population Age Structure.**

4.0 SUMMARY AND COMMENTARY

This report offers a series of population projections for Newfoundland and Labrador and its regions for the period 2016-2036. Three projection models are developed: the Natural Survival model (NS), which considers only those changes associated with births and deaths; the Historic Survival model (HS), which considers births, deaths and migration, and; the Replacement Survival model (RS), which estimates the number of net in-migrants required to maintain the current workforce population for each region, given historical trends of births, deaths and in/out migration. For each of the HS and RS models a number of scenarios are developed based on different assumption sets. The details of each model and their geography are outlined in Section 1 of the report and the Appendices.

The results present a challenging picture for most regions in the province. With the exception of the North East Avalon and to a lesser degree some parts of Labrador, regional populations are projected to continue to decline and age over the 2016-2036 timeframe. For most regions birth rates are low and outmigration of the young and those females in their childbearing years mean that regional populations are not being reproduced. Out-migration, particularly of the young and those in the labour force, together with the relative immobility of older members of the communities and their increasing longevity, is reflected in declining numbers and aging regional populations.

This situation is not new, for the last 20 years or more the demographic structure of the province has shifted from a rapid growth model, in which the population was sustained through natural replacement, to a no-growth model in which population stability or growth can only be achieved through in-migration. This is particularly true for rural Newfoundland and Labrador where many of the regions have been in decline for multiple census periods.

The issues associated with a declining and aging population are not unique to Newfoundland and Labrador, but are common to most western economies at the present time. This does not make them any the less important, but common experiences may offer examples of how to address them.

Among the issues arising are questions relating to labour markets - how will future demands for labour be met given a shrinking and aging labour supply? In 2015 the provincial government of the time released a report titled *A Population Growth Strategy for Newfoundland and Labrador, 2015 – 2025* to address the issue of aging and workforce shortages, which stated that "this province is now at a point where the number of people leaving the workforce each year is exceeding the number of people entering" (Newfoundland and Labrador 2015). Likewise each year the average age of those in the province's traditional industries, such as fishing, fish processing and forestry increases – 2011 data indicate that 46%, 63% and 51% respectively of the workforce in each of these was 45 years or older (Statistics Canada 2011). Attracting in-migrants may be one option to meet labour force needs, increased automation may be another, but regardless of which option or options are determined to be most appropriate, there exists a need for immediate action and collaboration among all industry, labour and government players to try to address the problem.

Similarly, changes in the number, age and geography of the population has implications on the demand for public, private and non-government sector services. What services, what levels of demands will be required to be met and in which locations? The types and scale of problems likely to face the next generation of those living in the North East Avalon will be quite different from those of the Southern Avalon, but all regions face the problems of the cost and delivery of services in a period of significant economic constraint, the potential duration of which is unknown. Here there are social as well as economic considerations to weigh and priorities to determine. While such determinations are the usual role of government, current conditions may mean that some decisions will have significant effects on particular communities. How those decisions and effects are managed will require a strong, but sensitive government working with those affected.

As such, governance too will become an increasingly important consideration in the light of these demographic changes and challenges. Shrinking and aging populations reduce the pool of candidates willing and able to run for local office. Increased demands of the job and fewer resources further limit the candidate base. A re-thinking of the current governance model is underway. The changing demographic landscape requires that a new model be developed and implemented as soon as possible.

As noted, the demographic changes ongoing in the province are not new and the issues that arise from those changes not surprising. The purpose of this report is not simply to restate this information, but rather to ensure that the current and projected demographic situation is clearly understood so that its implications can be recognized, more fully debated and appropriate actions considered. This report is thus intended as a source of information about the current and projected demographic situation and a baseline for further study about its implications. This report and others based on it that explore some of the key policy implications are available at www.mun.ca/harriscentre/populationproject.

These are complex questions with few easy answers, but they and others are questions that must be addressed; to ignore them is unacceptable and to do so would be irresponsible. The authors of this report hope that the information provided here will help inform the debate.

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APPENDIX 1: Survival Model Assumptions

The assumptions for the birth, death and migration components[5] of population growth are as follows:

[1] Predicted Births = {(Female Population by Age Class)*(Total Fertility Rate)*(Age Specific Fertility Rate/Total Fertility Rate)}

[a] Female Population by Age class geography = Local Area
[b] Baseline Total Fertility Rate year = 2011
[c] Geography for [b] = Local Area Geography
[d] (Age Specific Fertility Rate/Total Fertility Rate) trend years = 2003 to 2013
[e] Geography for [d] = Local Area

[2] Predicted Deaths = {(Male and Female Population by Age Class)*(Male and Female Death Rate by Age Class)}

[a] Male and Female Population by Age Class geography = Local Area
[b] Male and Female Death Rate by Age Class trend years = 2009-2013
[c] Geography for [b] = Functional Region Class (FERs)

[3] Migration = {(Total Population by Age Class)*(Total Migration Rate)*(Age Specific Migration Rate/Total Migration Rate)}

[a] Total Population geography = Local Area
[b] Total Migration trend years 2001 to 2011
[c] Geography for [b] = Functional Economic Region (FERs)
[d] Age Specific Migration Rate trend years = 2001 - 2006 augmented by 2011
[e] Geography for [d] = Functional Economic Region (FERs)
[d] In-Migration = Intra-Provincial, Inter-Provincial and External
[e] Out-Migration = Occurs when negative growth occurs for a forecast year after accounting for fertility, deaths and in-migration factors

5) All data used in this study were downloaded from the NL Statistics Agency Community Accounts or Statistics Canada 2011 Census data portals.

APPENDIX 2: Functional Economic Regions

The functional economic regions study (Simms *et. al*, 2013) describes how FER regions were classified and differentiated. It is evident that Urban and (Small) City Regional Town type regions comprise the higher order regions in terms of population and nearest to larger urban centres, while the three types of rural regions (First, Second and Third Order Rural) have smaller populations and generally are further away from larger urban centres or small cities. Furthermore, a statistics test of the difference of medians and distributions[6] for all 11 socio-economic indicators (e.g. nearness to urban centres, average weeks worked, education and industry diversity, etc.) indicate that the medians and distributions for each region type are significantly different with p= 0.001. This is confirmed by comparing region type density plots (see Figure 1.0 for selected economic indicators). The implication of this result is that each region type represents a different distribution for each variable and the regions are therefore distinct on these indicators.

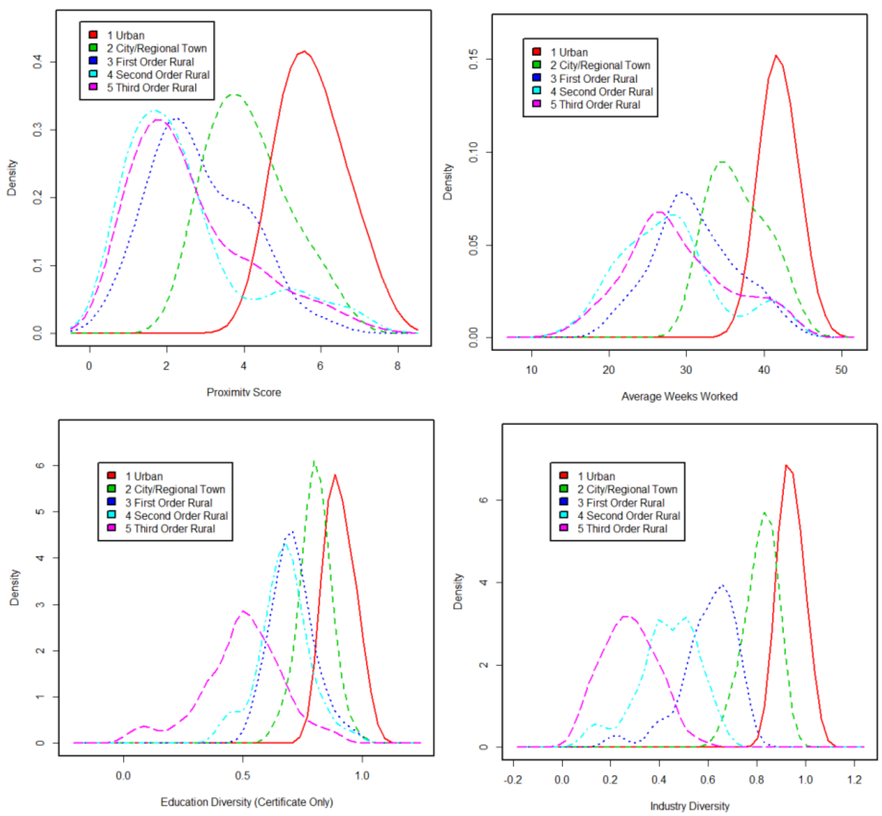

Figure 1.0 Density Distributions by Functional Region Type

6) SPSS Medians test for k samples and Kruskal-Wallis 1 way ANOVA of k Samples were used to test the between region type differences.

This analysis produced five regional types, four of which, (Urban Centres are excluded), are relevant for the Labrador study area (Simms, *et al*., 2013 and Freshwater, *et al.*, 2014):

[1] Urban Centres – have populations ranging from 412,200 to a low of 45,645. All the urban regions have a relatively diversified economic structure, but regions with populations of 100,000 or more will have a comparative advantage over the smaller urban regions. Of these 91 % are classed as having very high industry diversity and 9% as high diversity. By international standards, these are all small cities, but in the context of Atlantic Canada these are the largest urban places and each has some potential to develop some sort of a self-sustaining growth process.

[2] Small Cities and Regional Towns – have regional populations ranging from 39,805 to 9,225. These regions are characterized by having at least one reasonably sized town that is a focal point for public services for its region and for adjacent smaller regions. Some of the regions in this category are quite distant from urban centre regions and have a significant spatial reach into other smaller regions. Other members of this group are relatively close to a larger region that dominates the broader territory. These regions are large enough to exhibit a relatively diverse economic structure by Atlantic Canada standards, with, 86% classed as having high industry diversity and 14% having moderate diversity.

[3] First Order Rural - these regions have total populations ranging >=2000 to < 8000, and contain communities with population sizes ranging from 50 to 6,994 people distributed across an otherwise sparsely populated region. These regions have at least one small service centre for retail as well as government services, provide services to surrounding regions, and have fairly diversified economies. The breakdown for industry diversity is 3% high, 81% moderate, 13% low and 3% very low.

[4] Second Order Rural - The population of communities in these functional regions ranges from more than 50 to less than 2000 with at least one larger community with a population of greater than 1000 people. Industry diversity is somewhat lower in these areas with 37% of the regions classed as moderate, 55% classed low and 8% classed very low. In many cases these are single industry towns, and a single firm often dominates employment. Again, these areas are sparsely populated with limited connectivity between communities. People have to leave their region to obtain higher order retail goods and most public services.

[5] Third Order Rural – – A majority of these places are considered remote and have communities whose population ranges in size from 45 to less than 600 people. These places are not connected to other regions in terms of local labour markets, but residents in these regions must travel to other regions to obtain most goods and services, because very little is available locally. In these regions only 3% are classified as having moderate industry diversity, 55% with low diversity and 42% with very low diversity.