

Demonstrating ABMI bird models being used in ALCES Online

Lionel Leston

Fri May 29, 2020 1pm - 2pm (MDT)

ABMI Bird GLMs

- Model coefficients generated from 240 bootstrap runs of the model
- Median values of model coefficients were used to minimize influence of extreme coefficient values
- Variables included:
 - Local land cover type (Vegetation, human footprint)
 - Weighted-averaged forest age
 - Stand-scale cover types (Vegetation, human footprint)
 - Stand-scale amount of preferred habitat for each species
 - Latitude, Longitude
 - Climate variables

Five Scenarios run in ALCES Online, constructed in Mapper

The screenshot shows a web browser window with the URL `online.alces.ca/mapper/project/285/`. The browser's address bar and tabs are visible at the top. Below the browser window is the ALCES Online Mapper interface. The top navigation bar includes the ALCES logo, a home icon, a globe icon, a line graph icon, a cube icon, a question mark icon, a cloud icon, and a lightning bolt icon (highlighted with a red circle). The user is logged in as 'LionelLeston' and can click 'Log Out'. The main content area displays a list of scenarios under the heading 'Scenarios'. Each scenario is represented by a green button with the scenario name, a blue 'Duplicate' button, a dark grey 'Delete' button, and a grey button showing the number of actions. Below the list is a form titled 'Add New Scenario' with fields for 'Name*' and 'Description'.

ALCES

6527. Wetlands Flood

6526. Wetlands Water

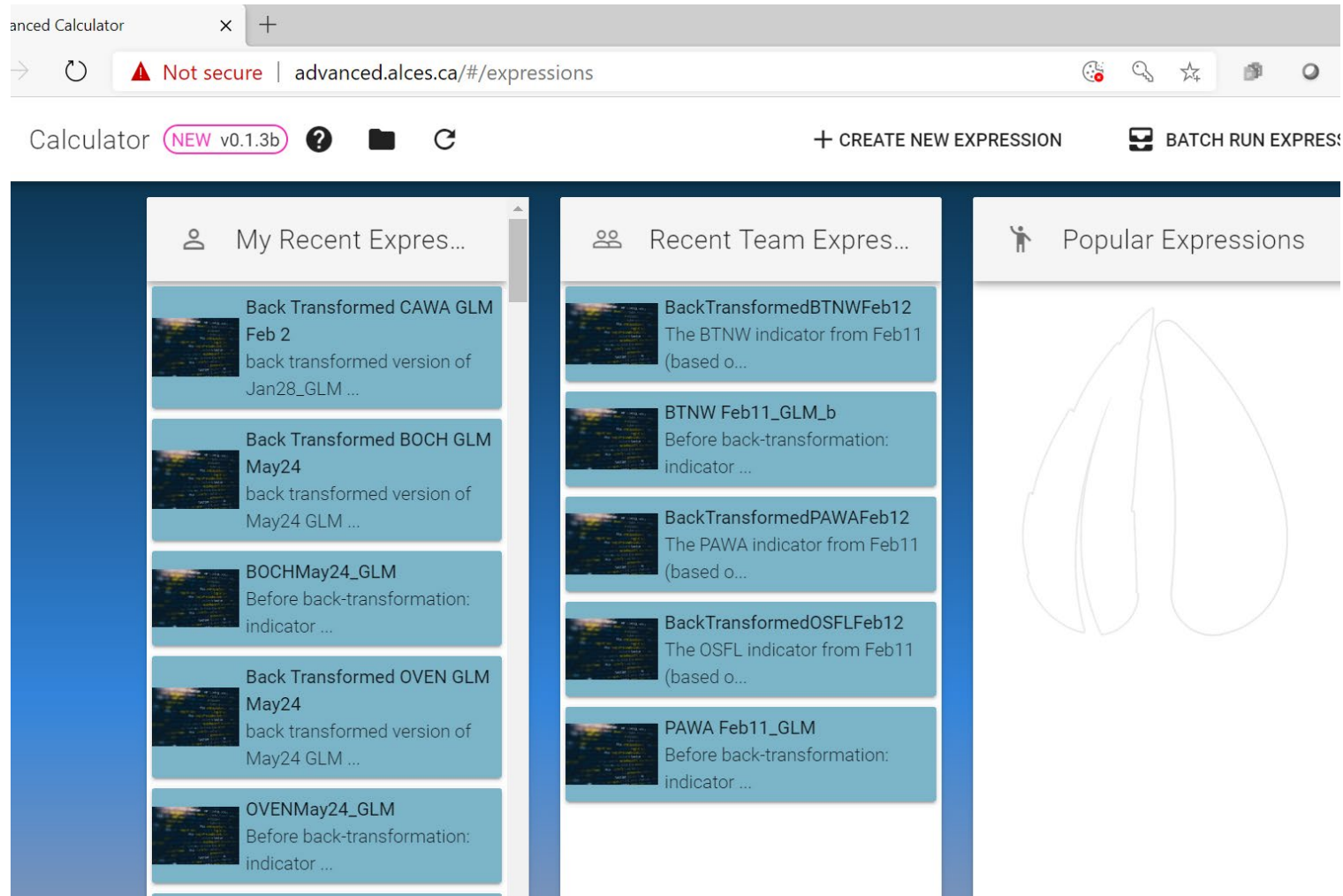
Scenarios

Alpac BAU 200 No Fire	Duplicate	Delete	19 action(s)
Alpac BAU 200 No Energy	Duplicate	Delete	15 action(s)
Alpac BAU 200 Increased Fire	Duplicate	Delete	21 action(s)
Alpac BAU with seismic reclamation 200	Duplicate	Delete	21 action(s)
Alpac BAU 200	Duplicate	Delete	20 action(s)

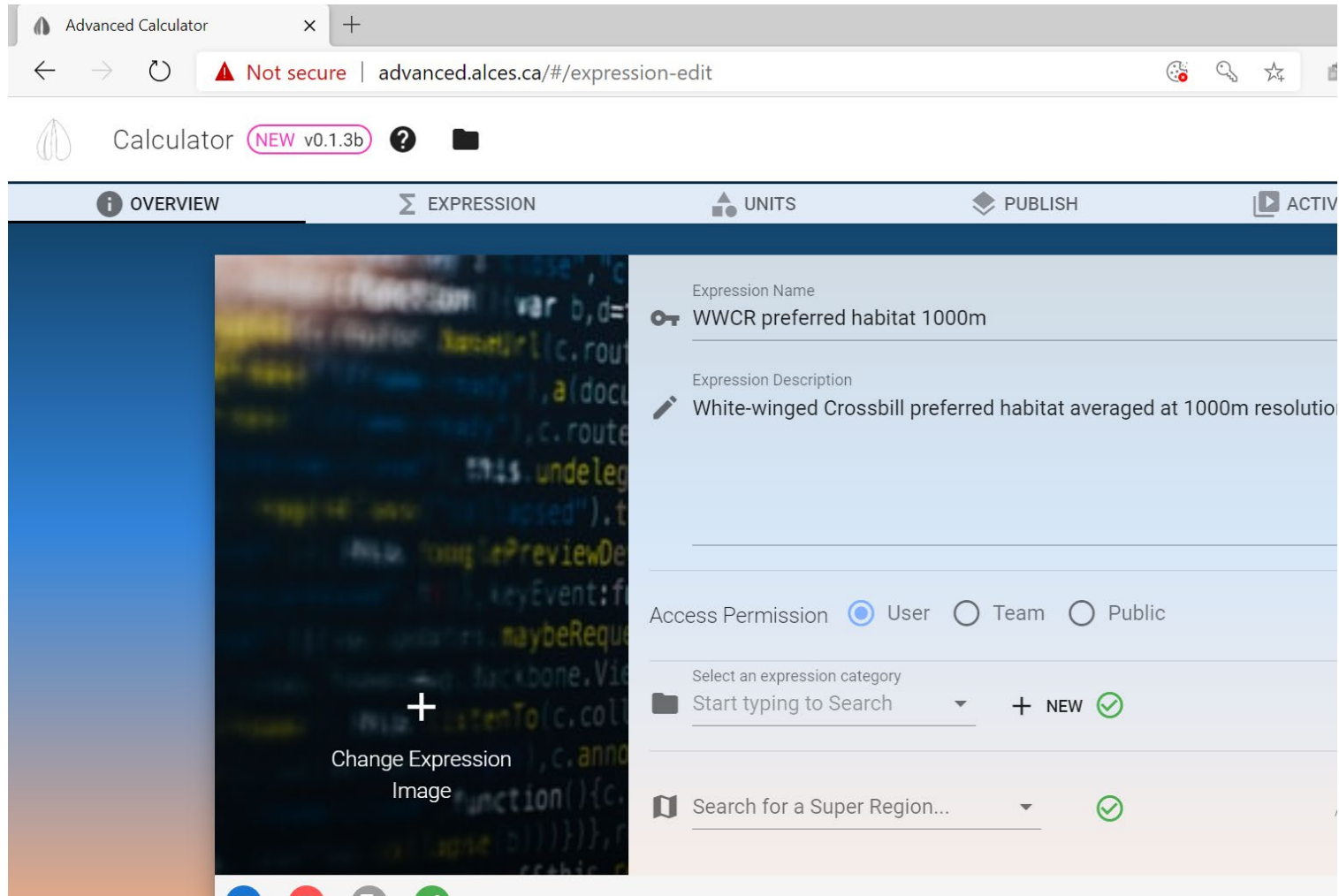
Add New Scenario

Name*

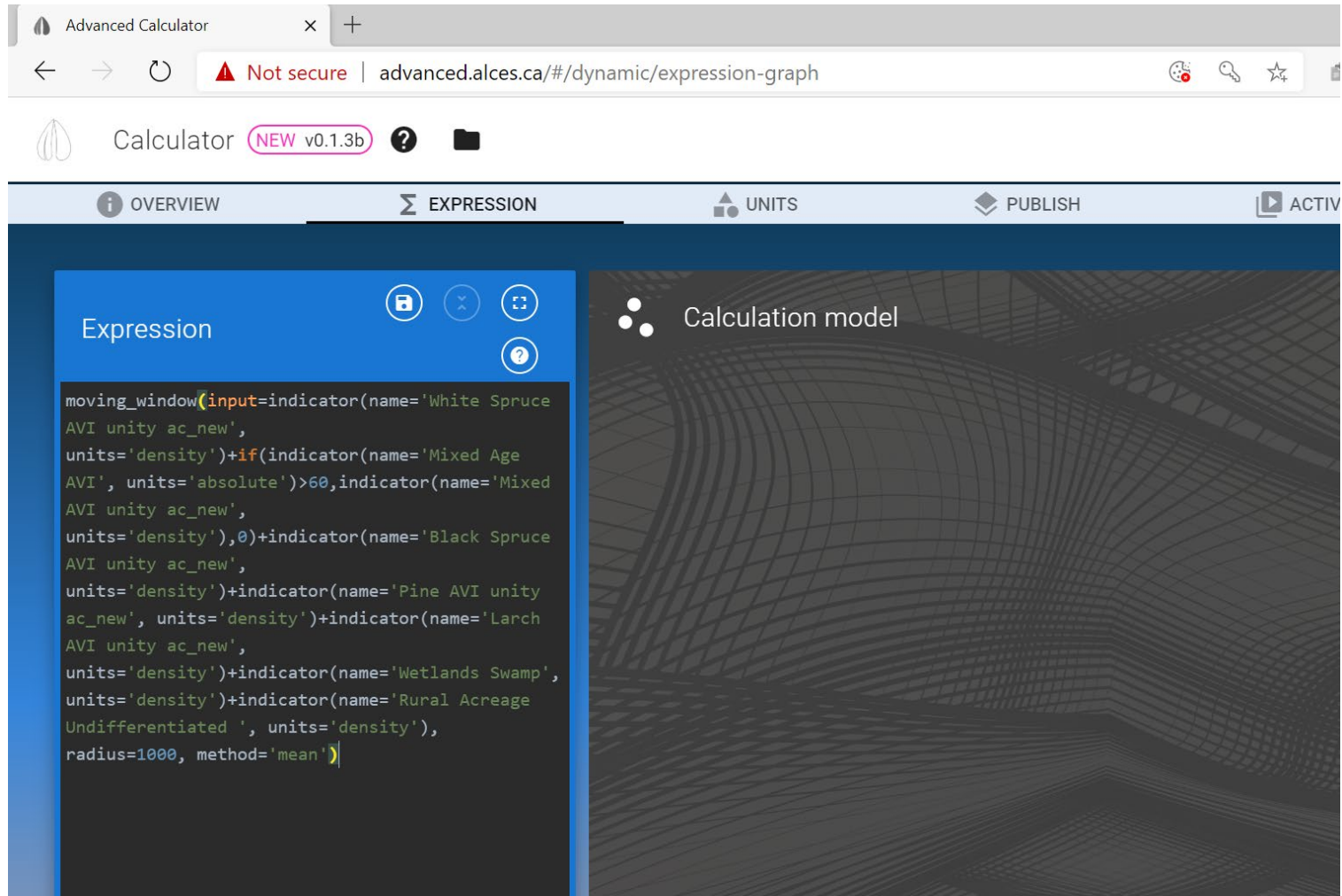
Description



Species
indicators
constructed
in ALCES
Advanced
Calculator
(or in Map)



Each species indicator included simpler indicators previously run in ALCES Online



Indicators are constructed as expressions using functions (e.g. moving window) and model coefficients (linked to existing raster layers in ALCES Online)

Once constructed, each simpler or more complex indicator must be run through land use scenarios and “published” to ALCES Online

Not secure | advanced.alces.ca/#/dynamic/expression-graph

Resolution

Projects) ALPAC FMA

(ALCES Projects) ALPAC FMA

Scenario

200

Alpac BAU 200

Temporal Options

Time Increment

Decadally

Start Time

2010

End Time

2060

Duration

5

Access Permissions

Search for a Team...

Alberta Pacific Forestry - HD

Alberta Pacific Forestry - HD

Output Indicator

Name

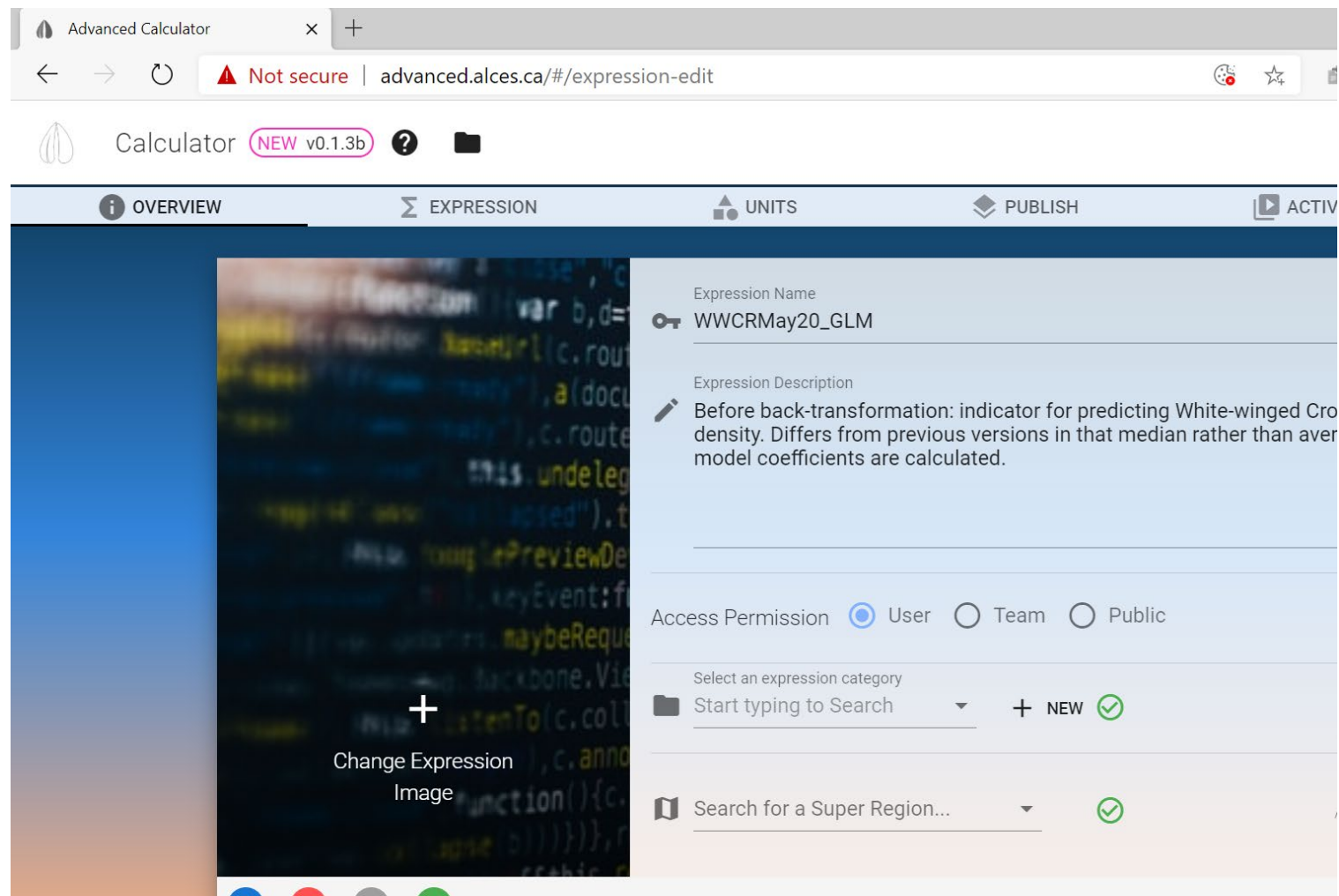
WWCR preferred habitat 1000m

Description

White-winged Crossbill preferred habi
averaged at 1000m resolution

Indicator Category

Alpac covariates



For complex indicators such as actual bird species, “simpler” complex indicators like “preferred habitat” should be run and published first.

Advanced Calculator

Not secure | advanced.alces.ca/#/dynamic/expression-graph

Calculator **NEW** v0.1.3b

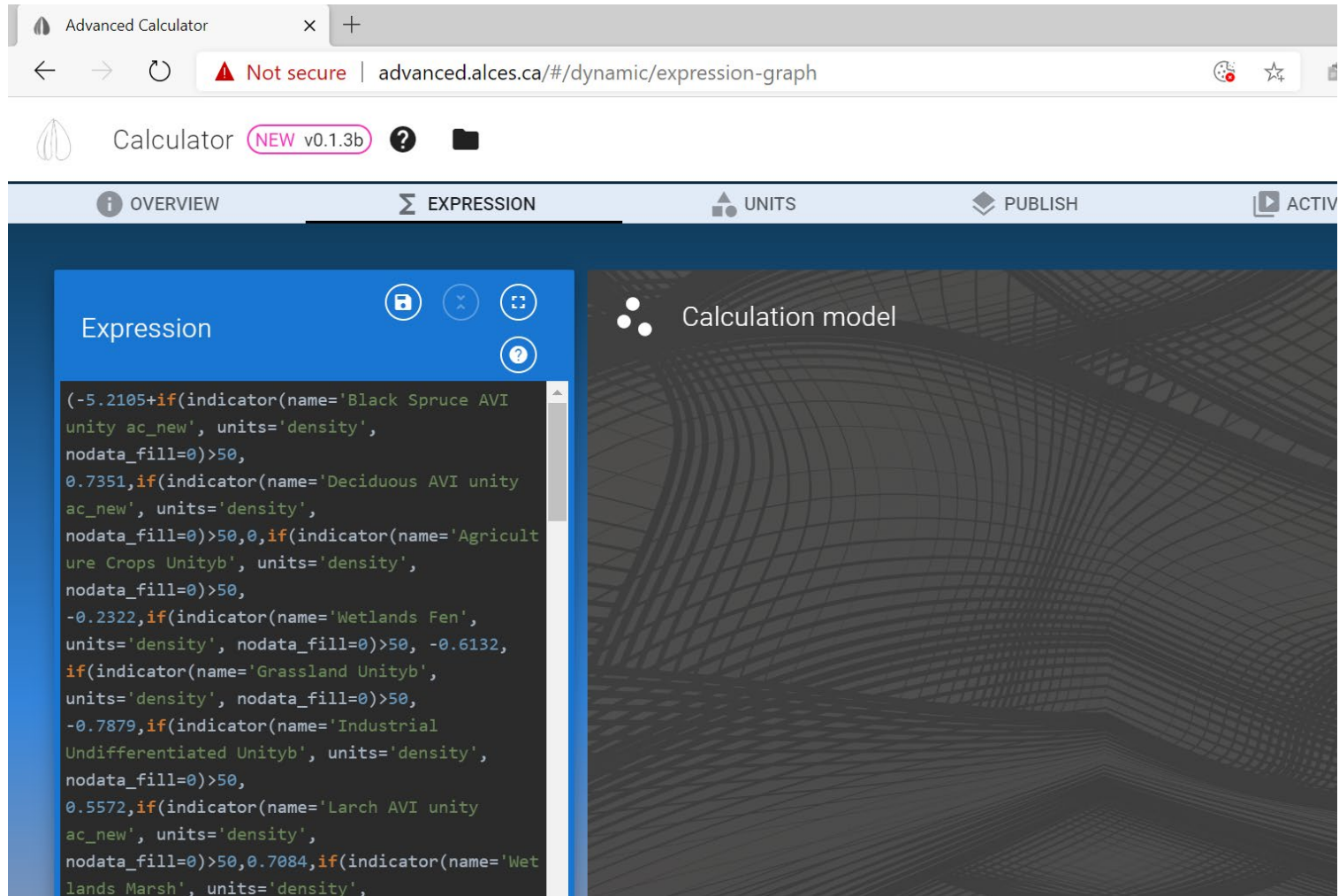
OVERVIEW EXPRESSION UNITS PUBLISH ACTIV

Expression

```
(-5.2105+if(indicator(name='Black Spruce AVI  
unity ac_new', units='density',  
nodata_fill=0)>50,  
0.7351,if(indicator(name='Deciduous AVI unity  
ac_new', units='density',  
nodata_fill=0)>50,0,if(indicator(name='Agricuilt  
ure Crops Unityb', units='density',  
nodata_fill=0)>50,  
-0.2322,if(indicator(name='Wetlands Fen',  
units='density', nodata_fill=0)>50, -0.6132,  
if(indicator(name='Grassland Unityb',  
units='density', nodata_fill=0)>50,  
-0.7879,if(indicator(name='Industrial  
Undifferentiated Unityb', units='density',  
nodata_fill=0)>50,  
0.5572,if(indicator(name='Larch AVI unity  
ac_new', units='density',  
nodata_fill=0)>50,0.7084,if(indicator(name='Wet  
lands Marsh', units='density',
```

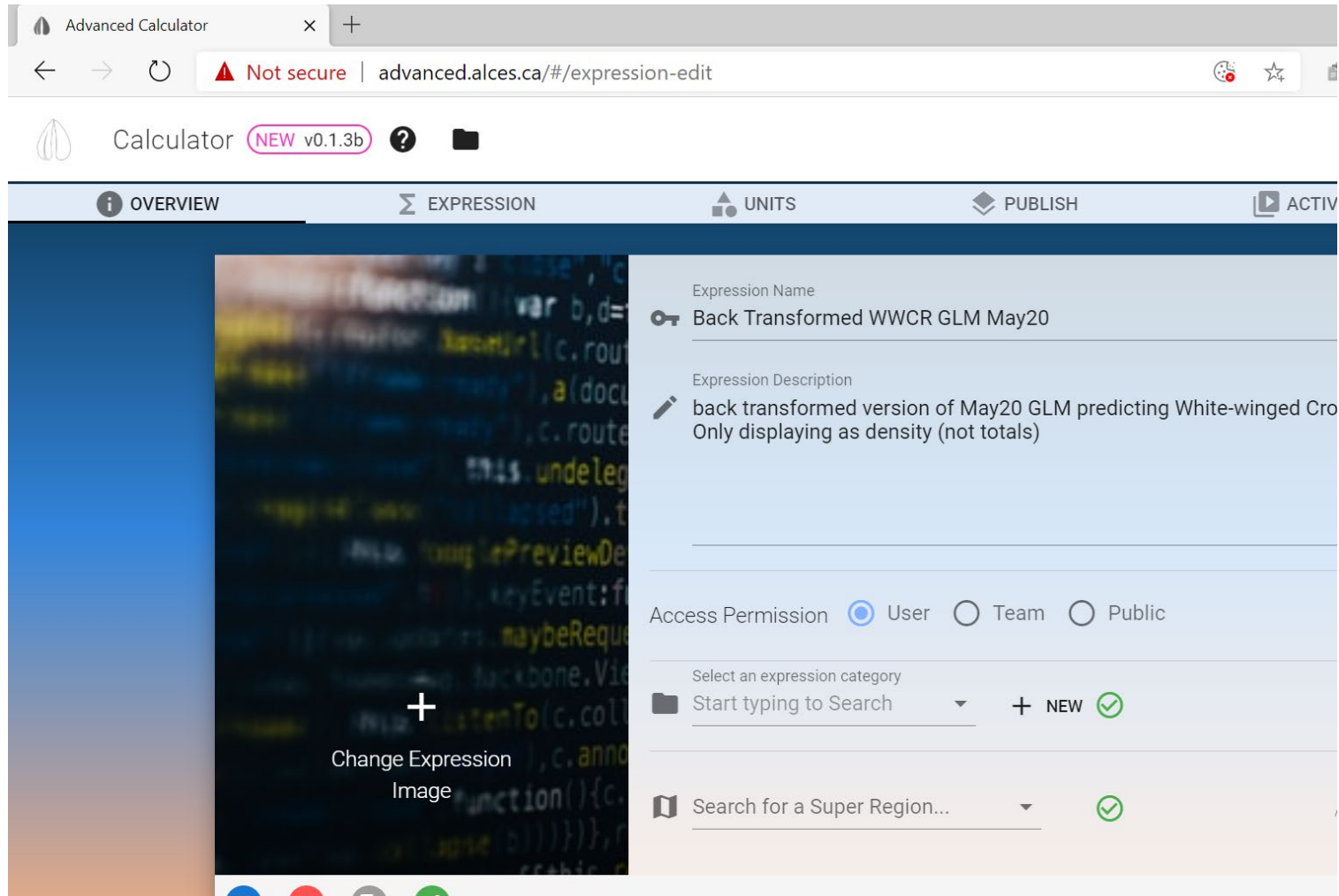
Calculation model

There can be up to a few dozen variables in each species indicator.



I complete a full indicator formula, then copy it to MS Word and change the coefficients for other species.

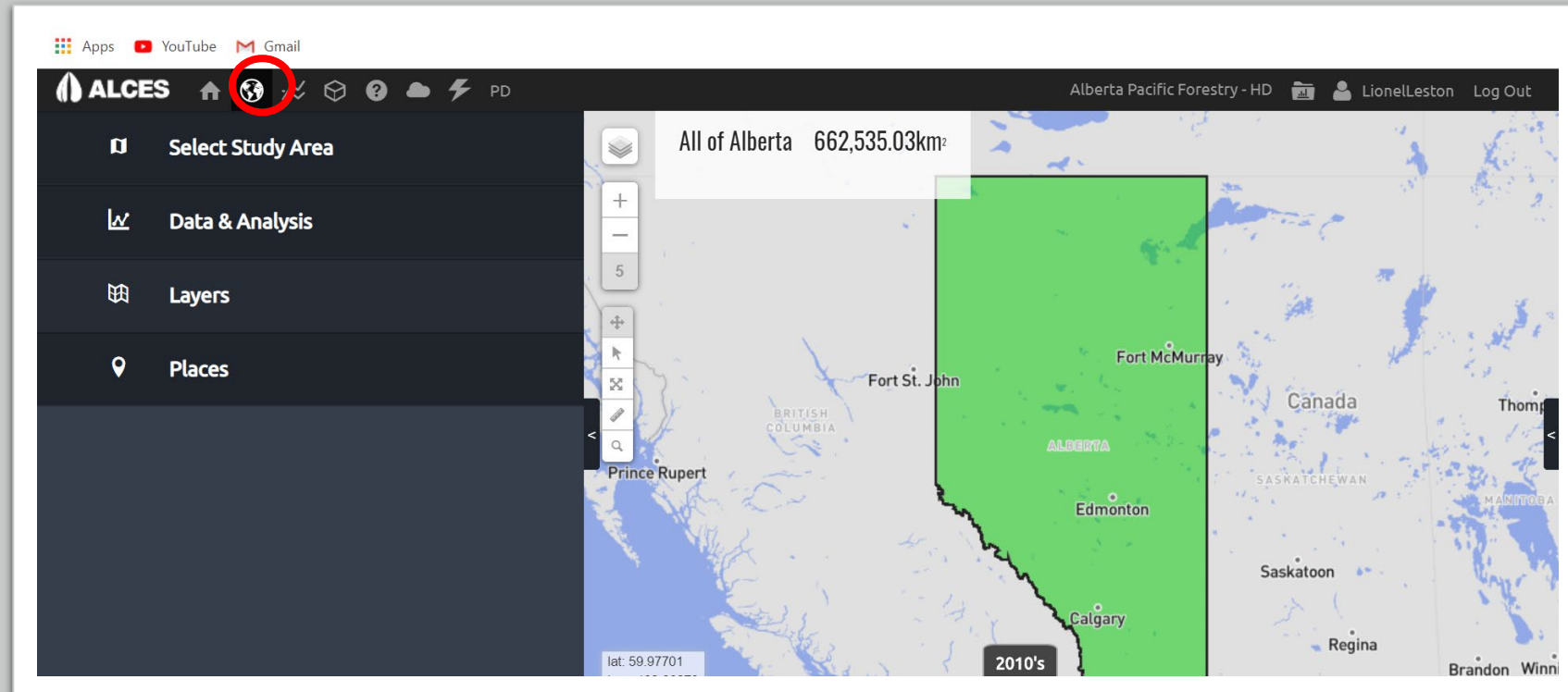
I then create an abbreviated indicator formula where variables with coefficient=0 are removed, and use that formula in other species indicators.



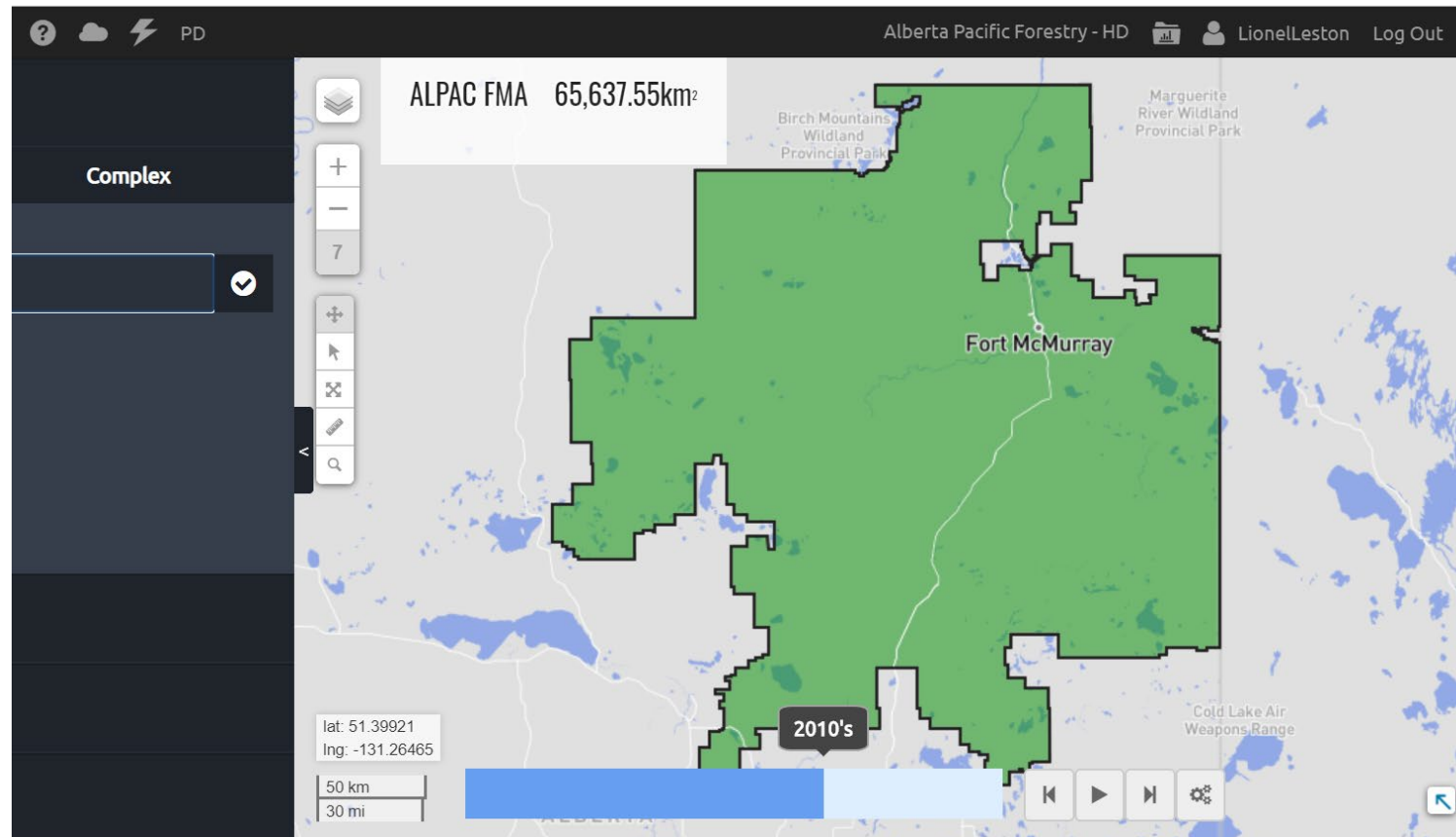
Original bird models were Poisson GLMs.

Predictions from species indicators are based on the linear predictor of bird model coefficients.

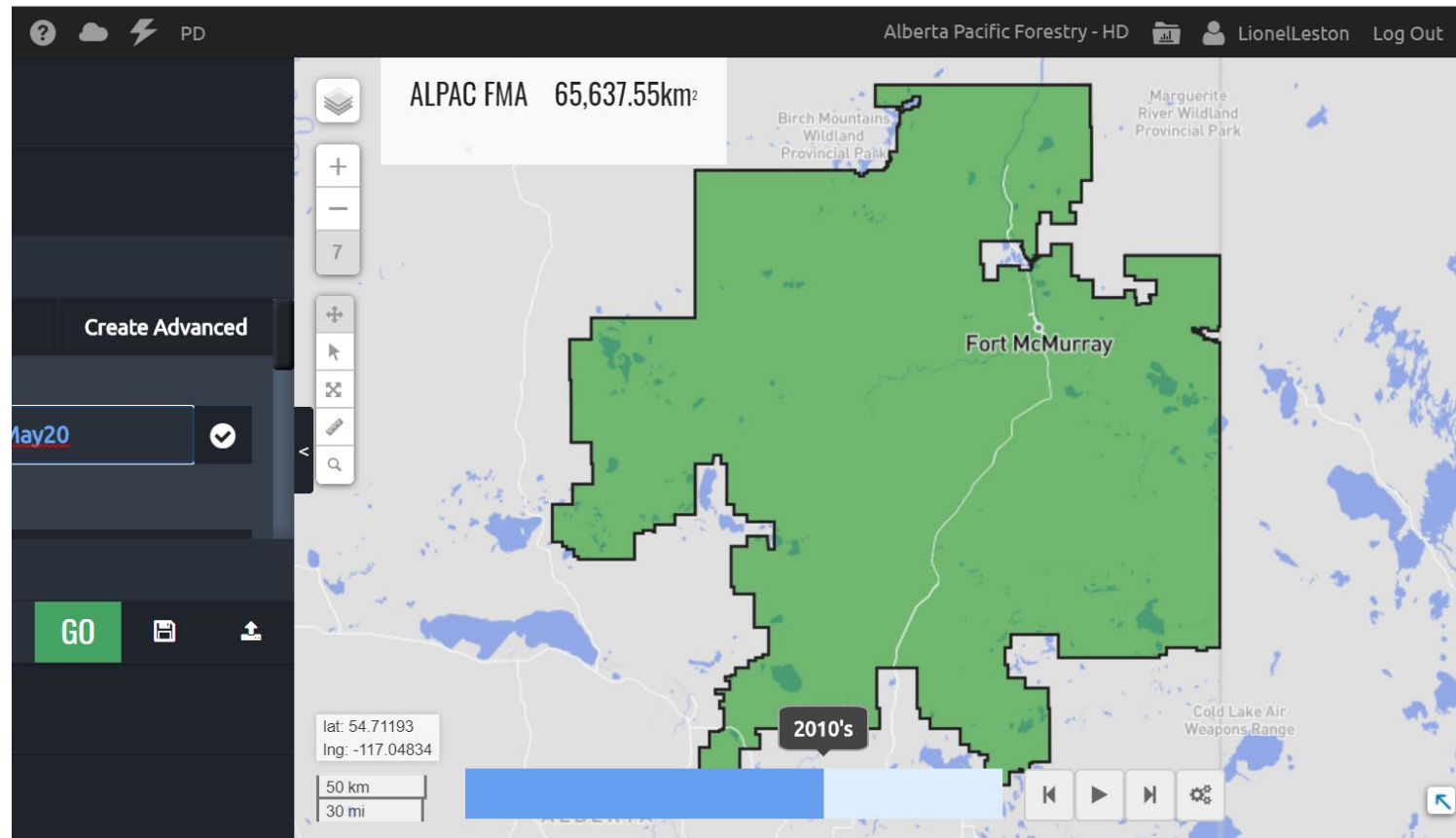
One more step needed: to back-transform (take the antilog of) the linear predictions to get predicted density (#males/ha)



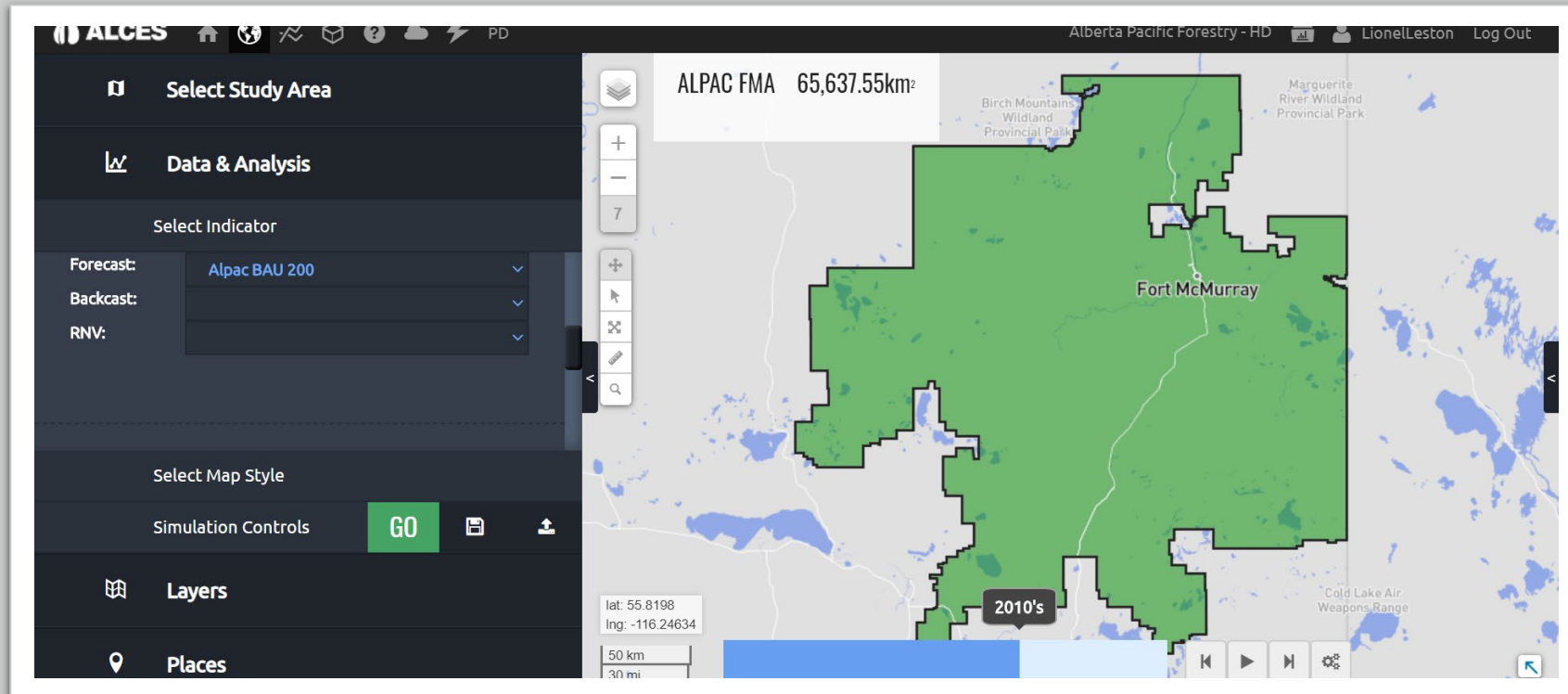
Once indicator has been published, predictions can be viewed in “Map” component of ALCES Online



I pick a study area

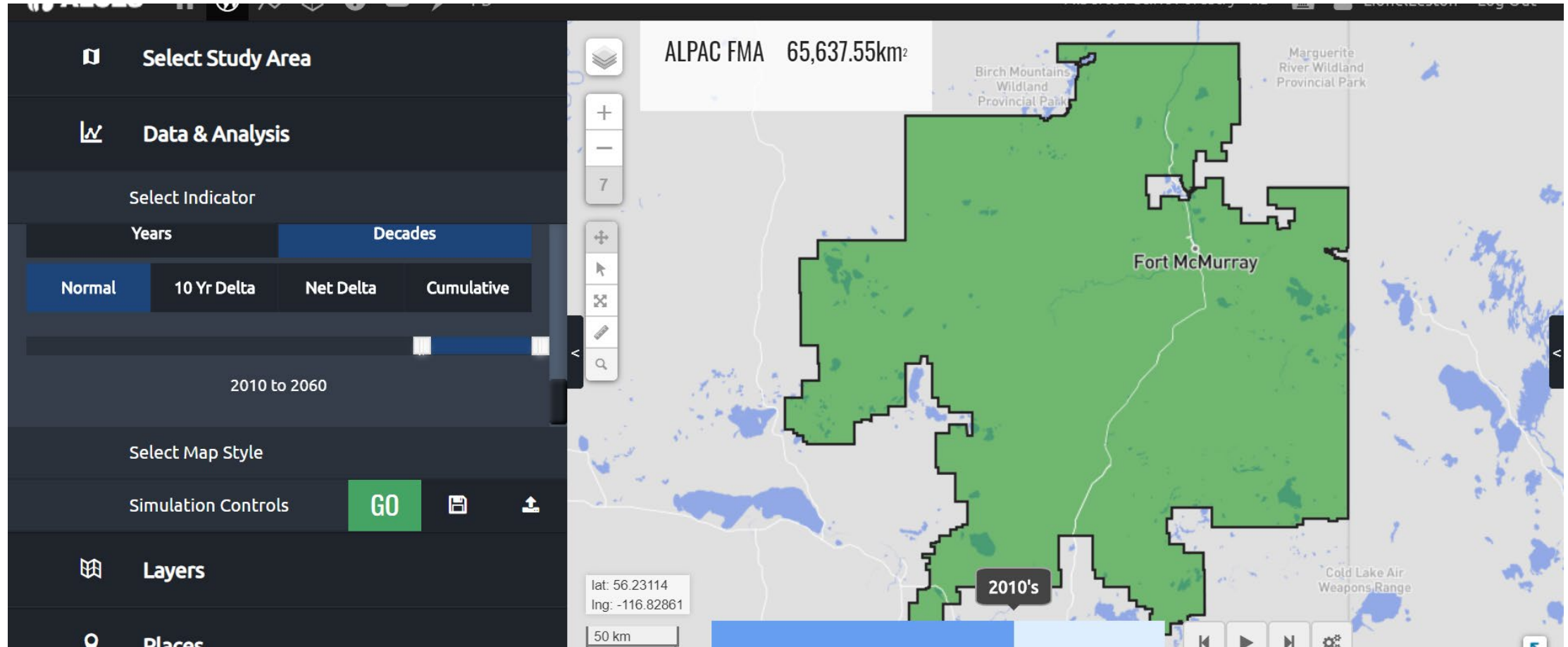


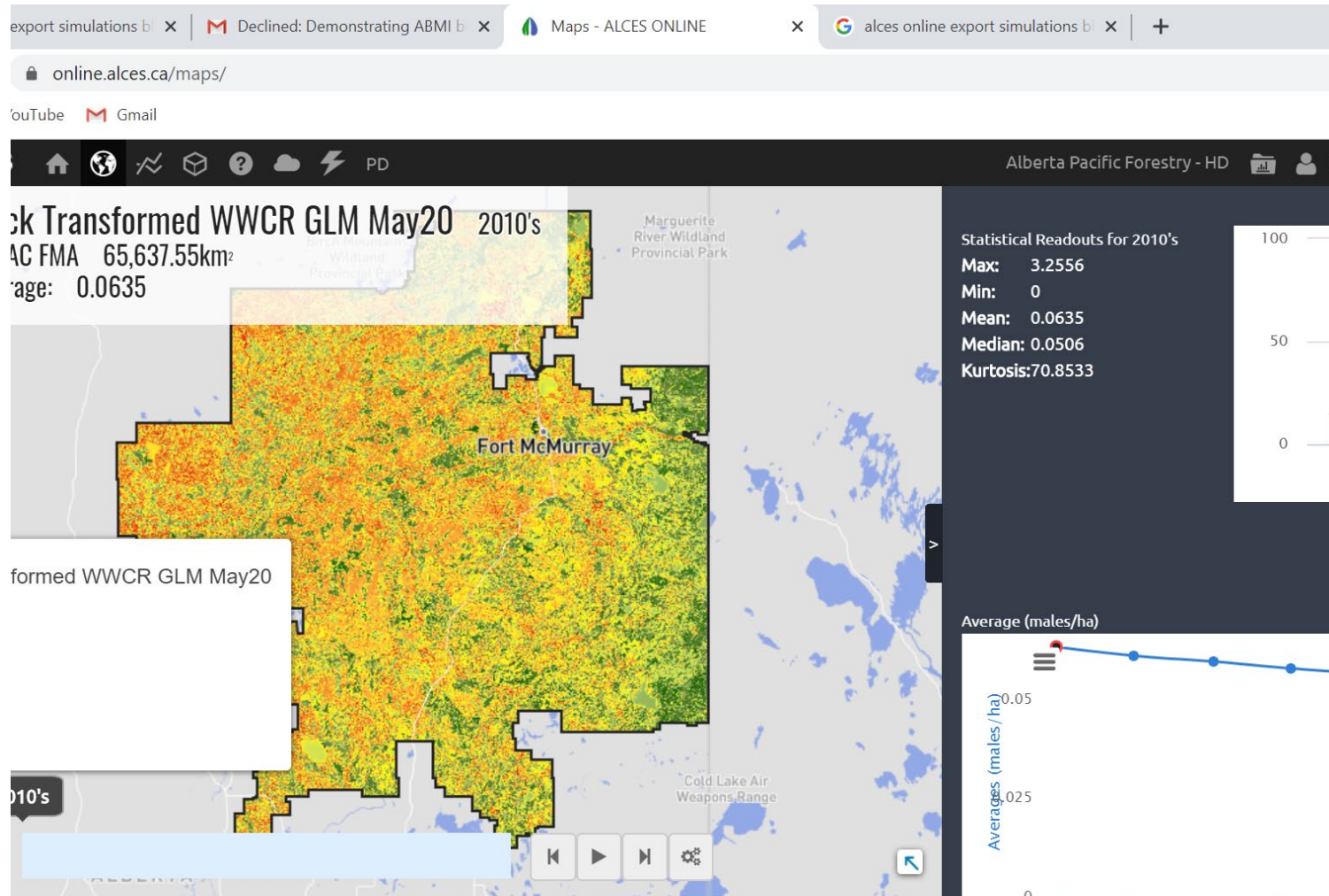
I pick an indicator



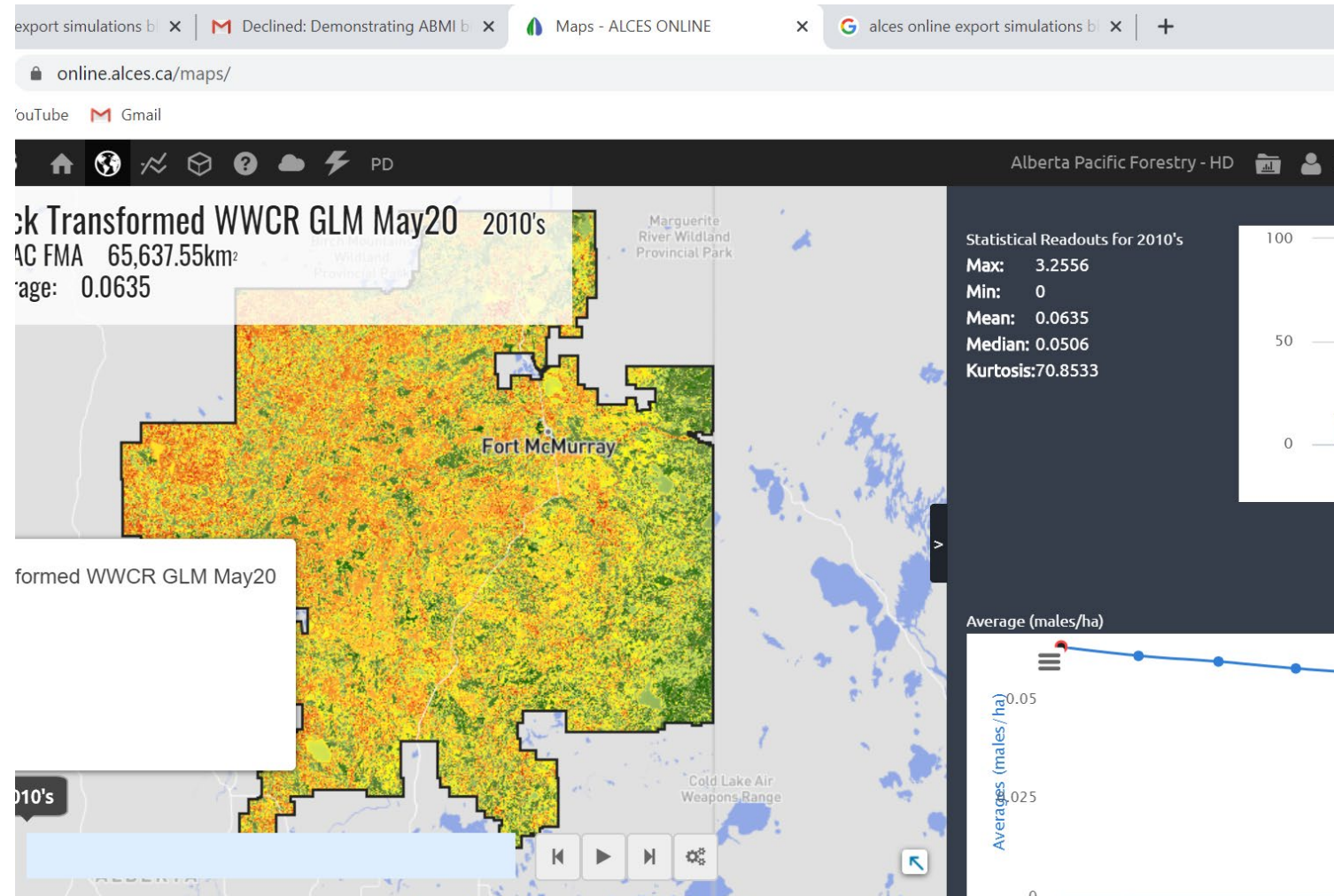
I pick a land use scenario and resolution I want to run at (e.g. 200 m)

And then I pick a time period over which to run the scenario (e.g. 50 years)

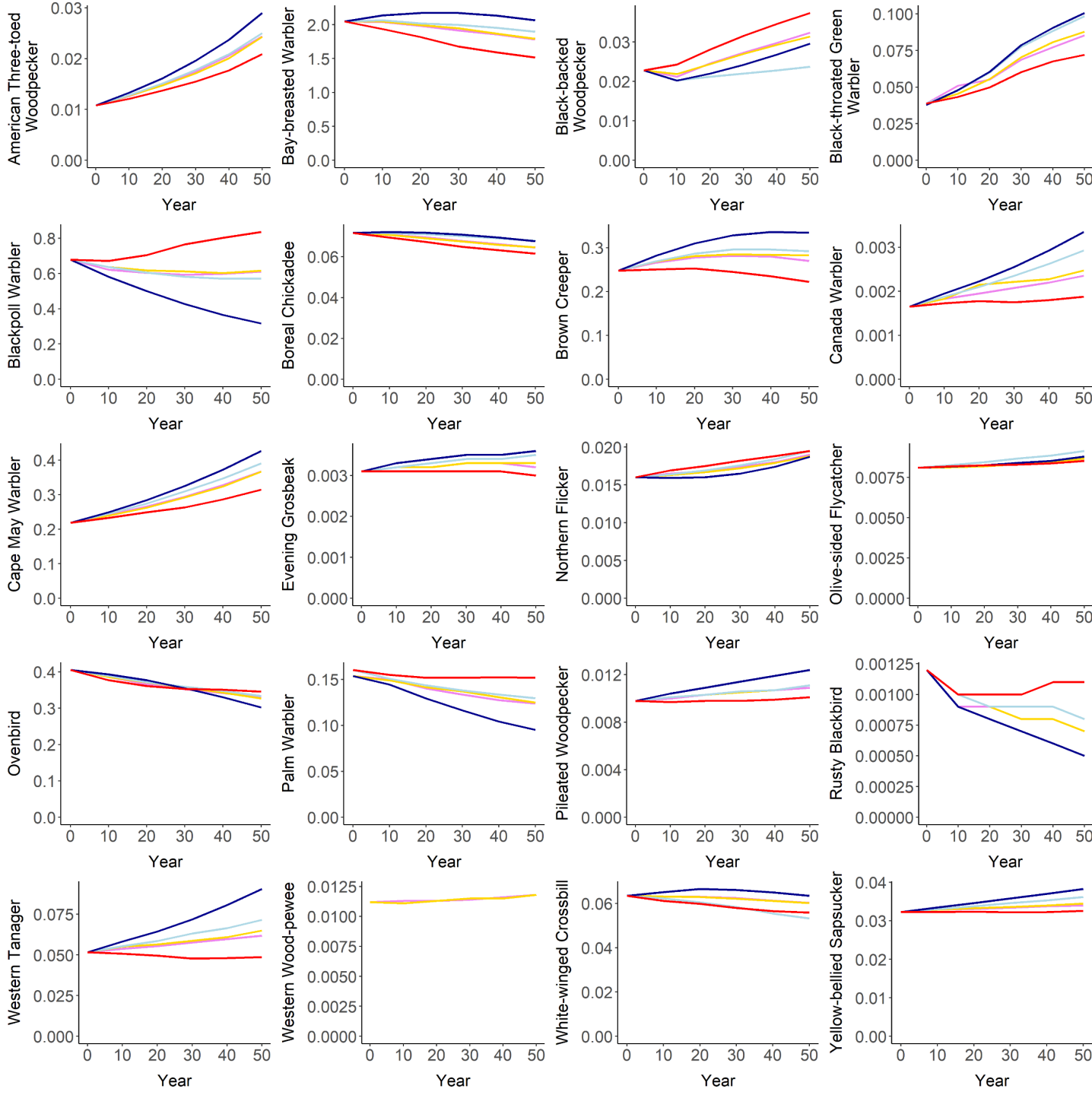




For a given
scenario,
species
population
calculated as
mean
density * #
hectares



I now have
projected
populations
for 20
species over
5 scenarios



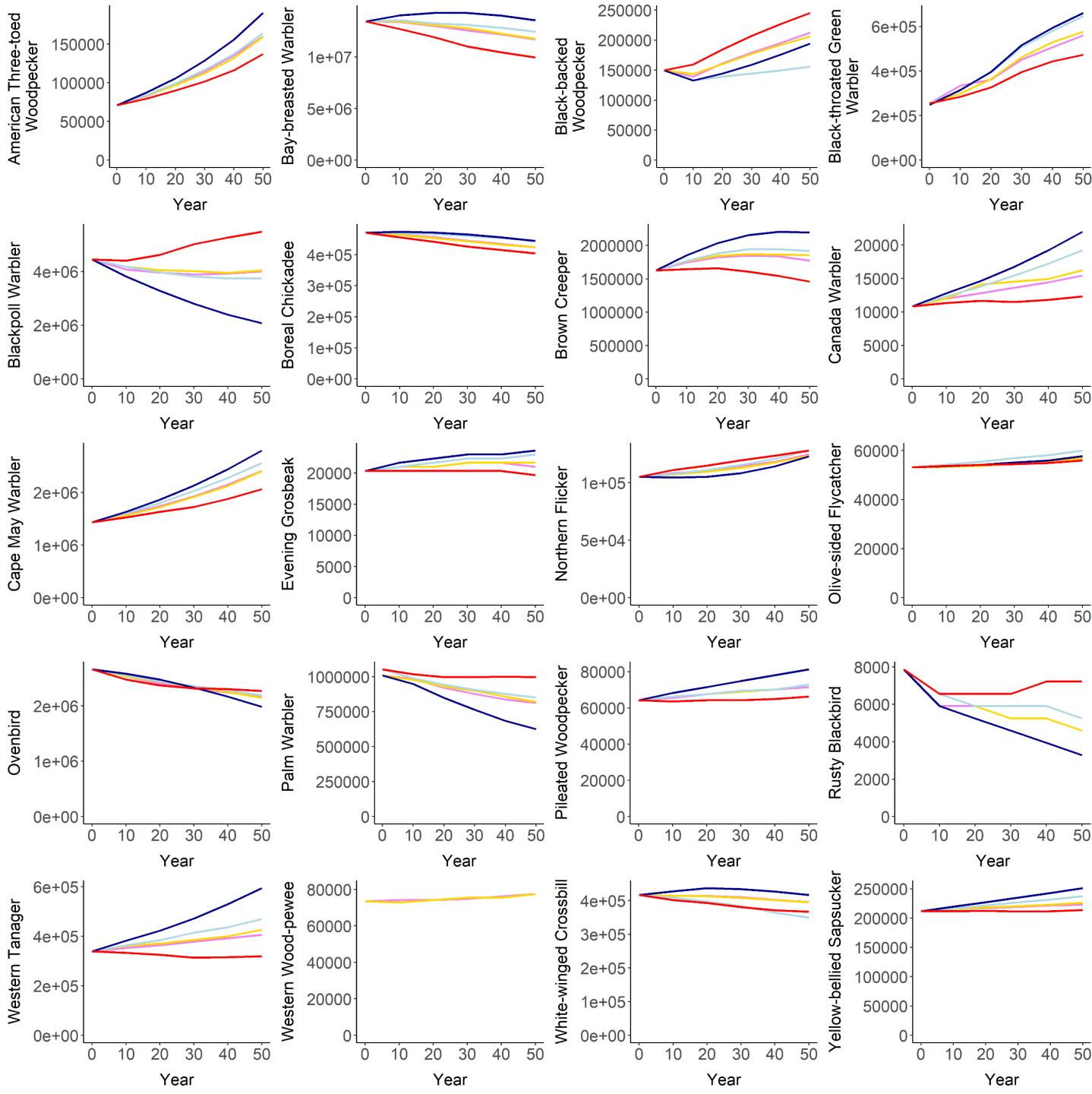
Energy + No Fire

Current Fire + No Energy

**AI-Pac BAU (Energy+Current Fire) +
Seismic Reclamation**

AI-Pac BAU (Energy+Current Fire)

Energy+2X Fire



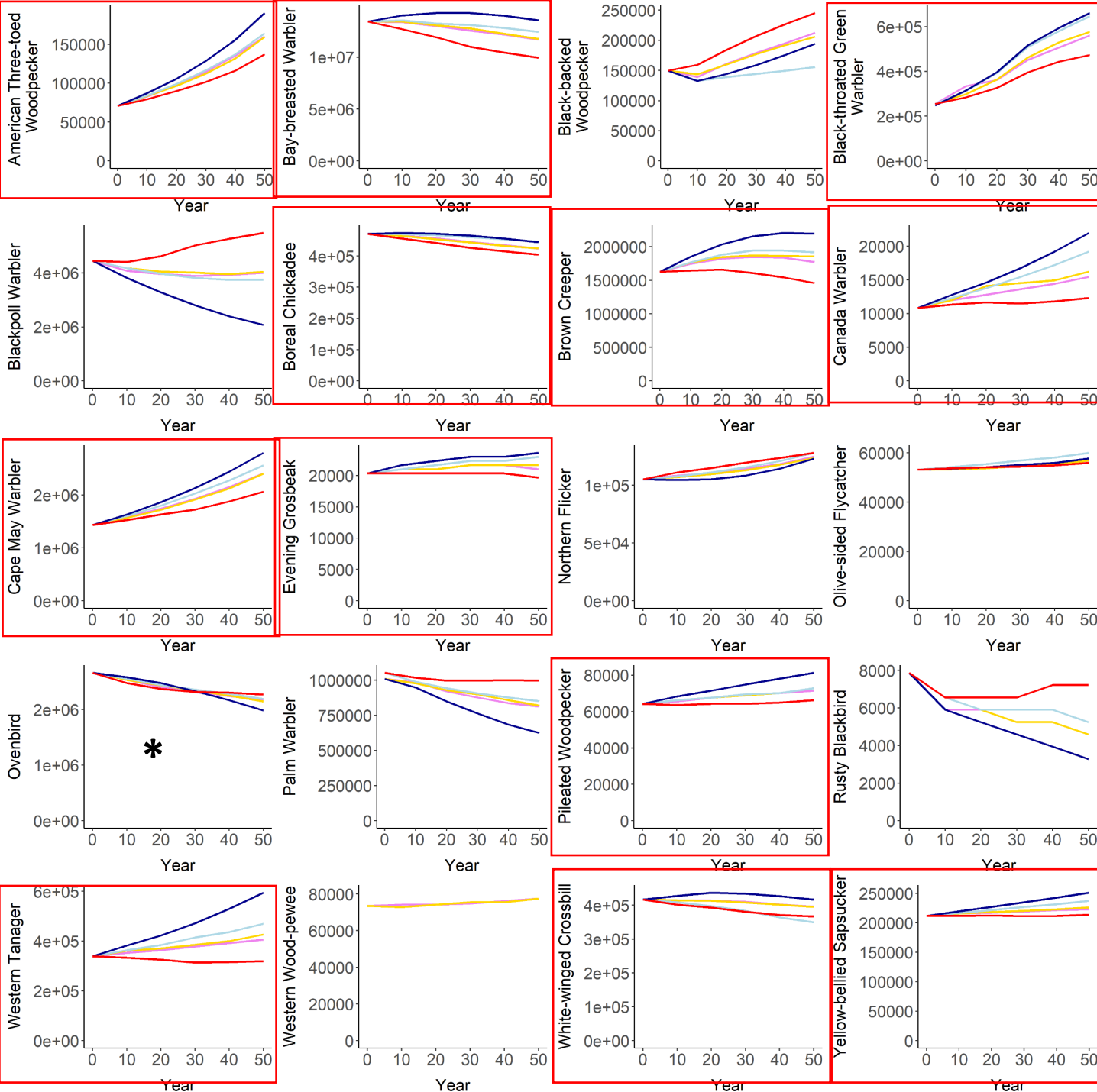
Energy + No Fire

Current Fire + No Energy

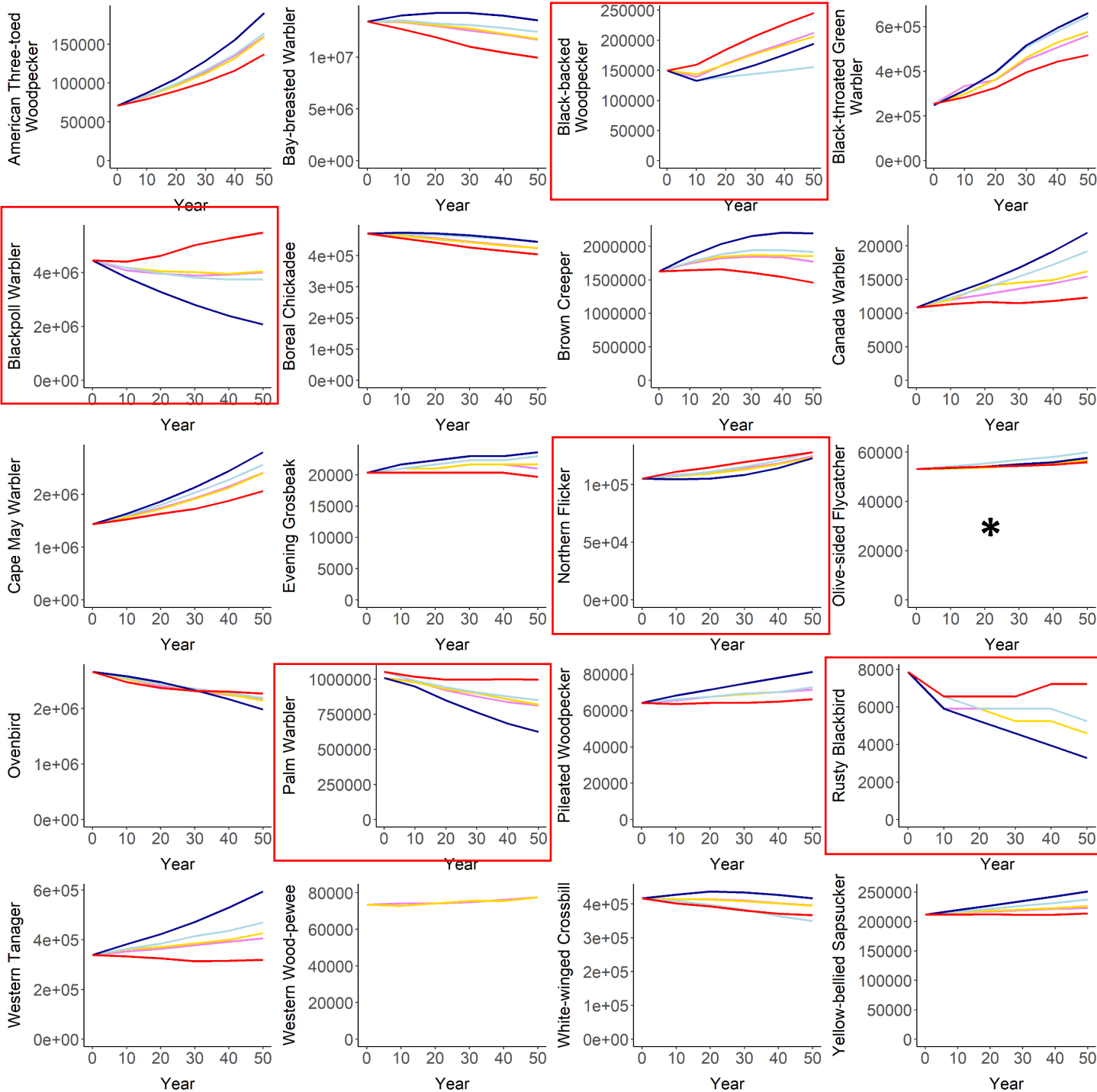
**AI-Pac BAU (Energy+Current Fire) +
Seismic Reclamation**

AI-Pac BAU (Energy+Current Fire)

Energy+2X Fire



Species associated with older deciduous, mixedwood or coniferous forests generally responded negatively to fire and energy sector development



Species of interest to forestry managers associated with younger forests, burns or open lands generally responded positively to fire and energy sector development