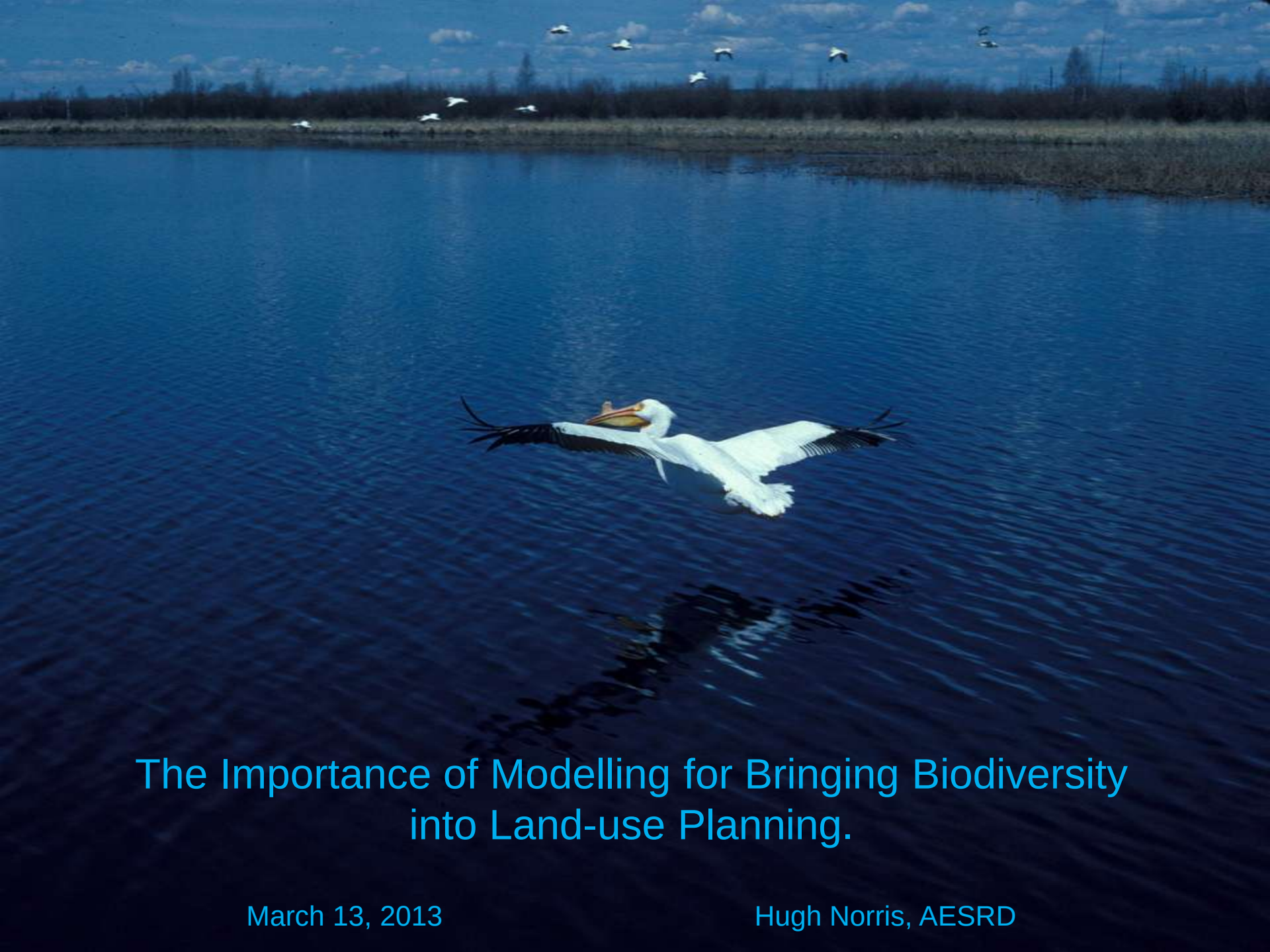


The Importance of Modelling for Bringing Biodiversity into Land-use Planning.

March 13, 2013

Hugh Norris, AESRD

Alberta Land-use Framework, 2008

- 7 regional plans with GoA approved future outcomes.

- Complete a biodiversity strategy.

- Balance social, economic and environmental values.

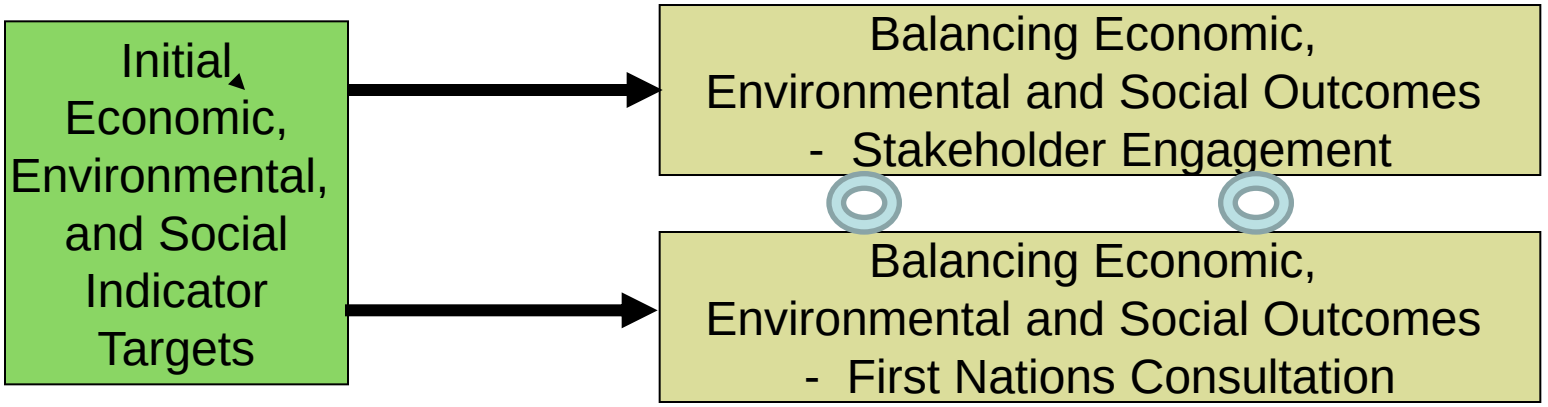
- New cumulative effects approach.

- GoA expectation to include Albertans in planning.

- LARP - build a Biodiversity Management Framework.

Planning - Building Plans and Management Frameworks

Cumulative effects – all values for one area considered at the same time.



GoA dept representatives will meet with a small but diverse group of stakeholders and with First Nations to try to optimize what everyone wants from the particular piece of land.

A Structured Recommendation Making process will be used to help the groups.

Recommendations go to the GoA who will finalize plans and Mgmt Frameworks.

Terrestrial Biodiversity Indicators

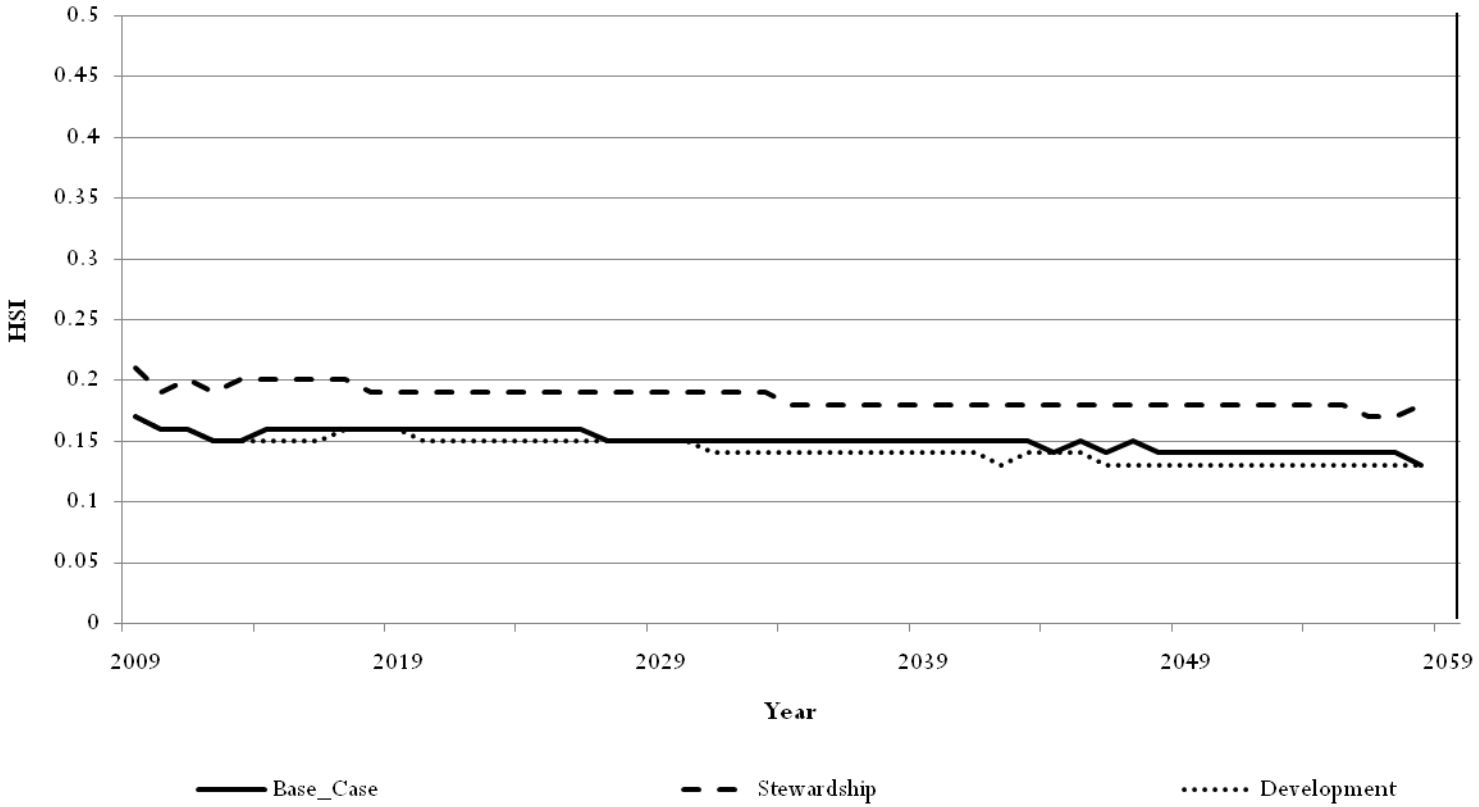
- Must represent breadth of biodiversity with:
  - coarse filters:
    - land-covers – 33, e.g., deciduous, white spruce, shrubland, fescue grassland, marsh,
    - habitat features – 11, e.g., amount of, seral stage, fragmentation, snags,
  - fine filters (often specific habitats):
    - guilds – 6, e.g., old forest birds, human associated birds, weedy vascular plants,
    - species – 16+, e.g., caribou*, moose, marten, barred owls, Canadian toad.

Aquatic Biodiversity Indicators

- coarse filters:
  - area of wetlands, standing water, flowing water,
  - habitat features – fishkill risk, stream continuity, riparian health,
- fine filters:
  - guilds – e.g., Index of Native Fish Integrity, wetland / riparian vertebrates,
  - species – Fish Sustainability Index.

- Must use models to project indicator status into the future.

Cumulative effects modelling provides indicator probable status trajectories under various land-use scenarios.



Results don’t mean much to most people – need context.

Cumulative Effects

- Land-use Framework definition - combined effects of past, present and reasonably foreseeable future effects of land-use on the environment over time.

- Usually don't have data on changes in quantity and quality of habitats and populations from the "past".

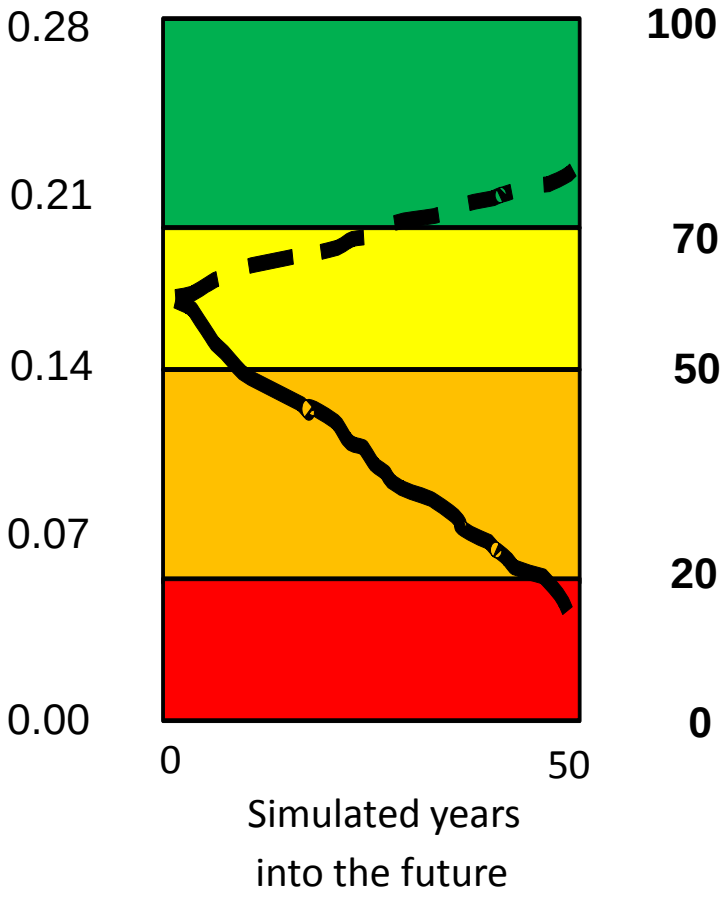
Range of Natural Variability

- Use modelling to project RNV of landscapes and indicators to pristine undisturbed by humans conditions, assuming no human footprint or introduced species, and assuming that natural disturbances occur as they did in the past.

- Repeating the modelling runs 50 or more times gives values to generate average, lower and upper limits of RNV.

Reference point = the average of RNV = 100%.
Risk assessment bands based on IUCN break-points.

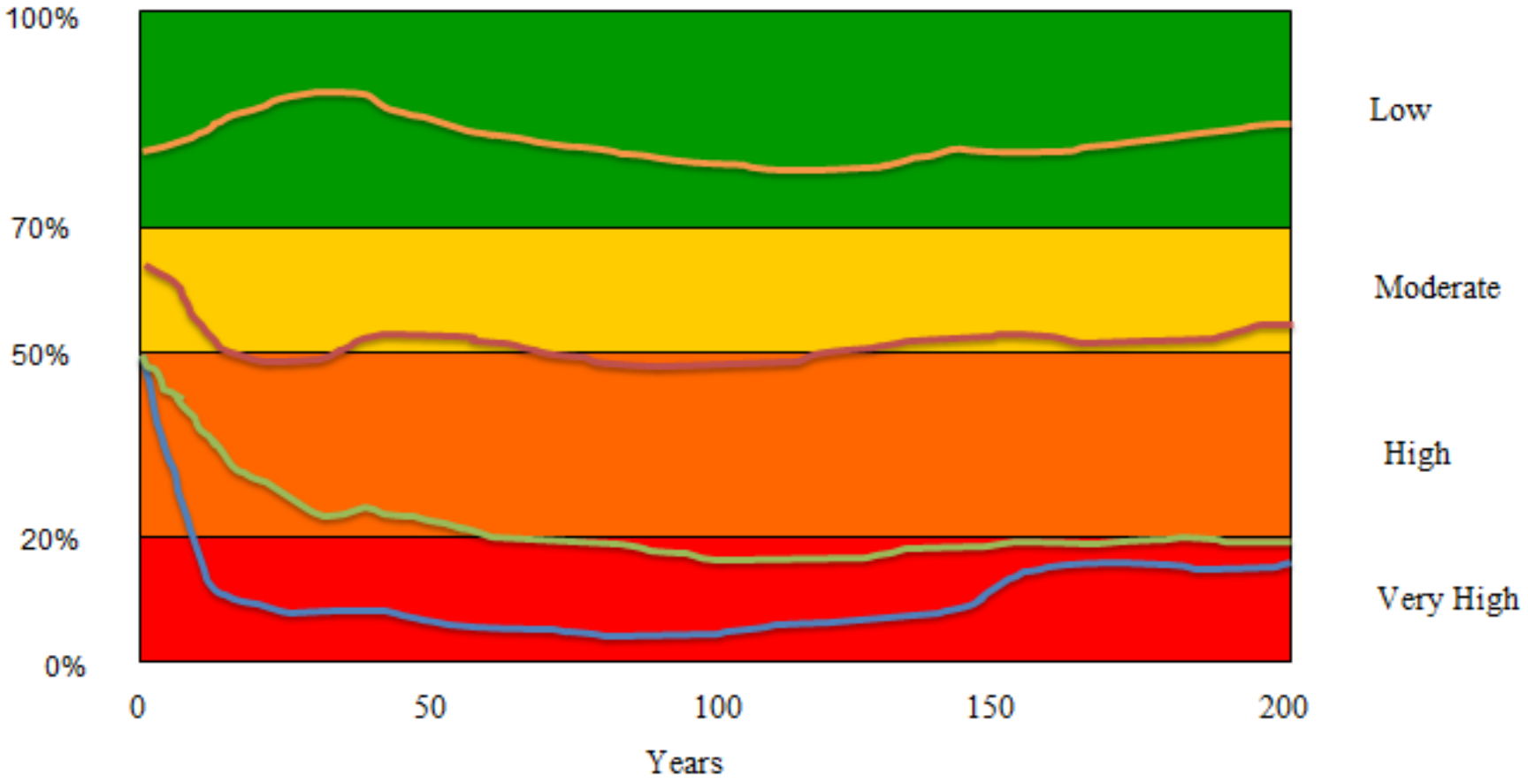
Indicator units (e.g., Habitat Suitability Index values for indicator X)



Proportion of native biodiversity indicator remaining compared to the pristine undisturbed by humans conditions

Within RNV is the preferred status from a biodiversity perspective. Secondary preferred status outside RNV is in the green or high in the yellow risk levels. Ultimately GoA will decide acceptable level of risk.

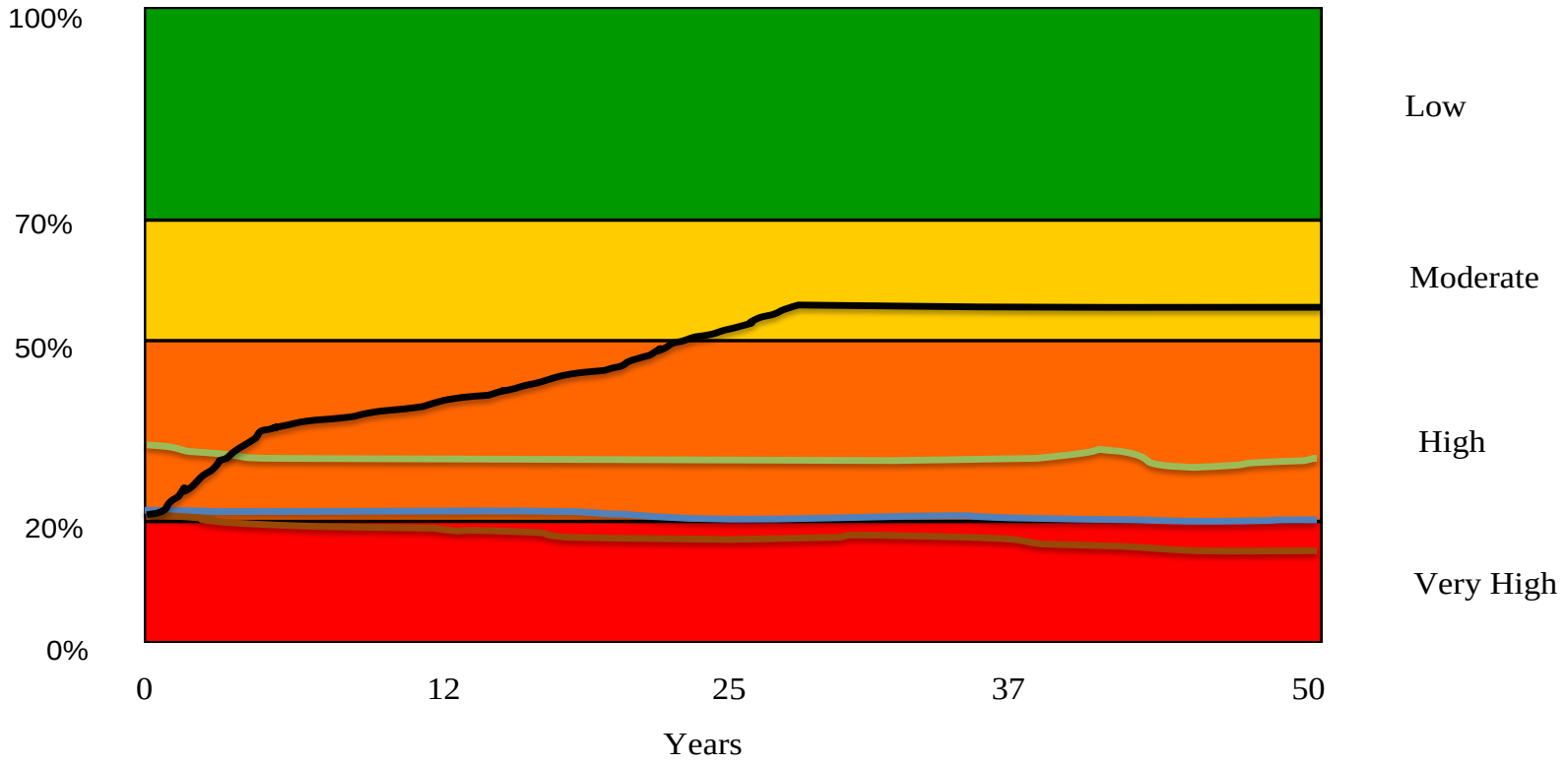
Modelling facilitates comparisons of different land-use scenarios.



Proportion of a biodiversity indicator remaining compared to undisturbed (by humans) conditions and risk assessment bands.

Example 1. Indicator model results: ---- **Base Case**; ---- **Best Practices**; ---- **Moderate Best Practices + Access Management**; ---- **High Best Practices + Access Management**

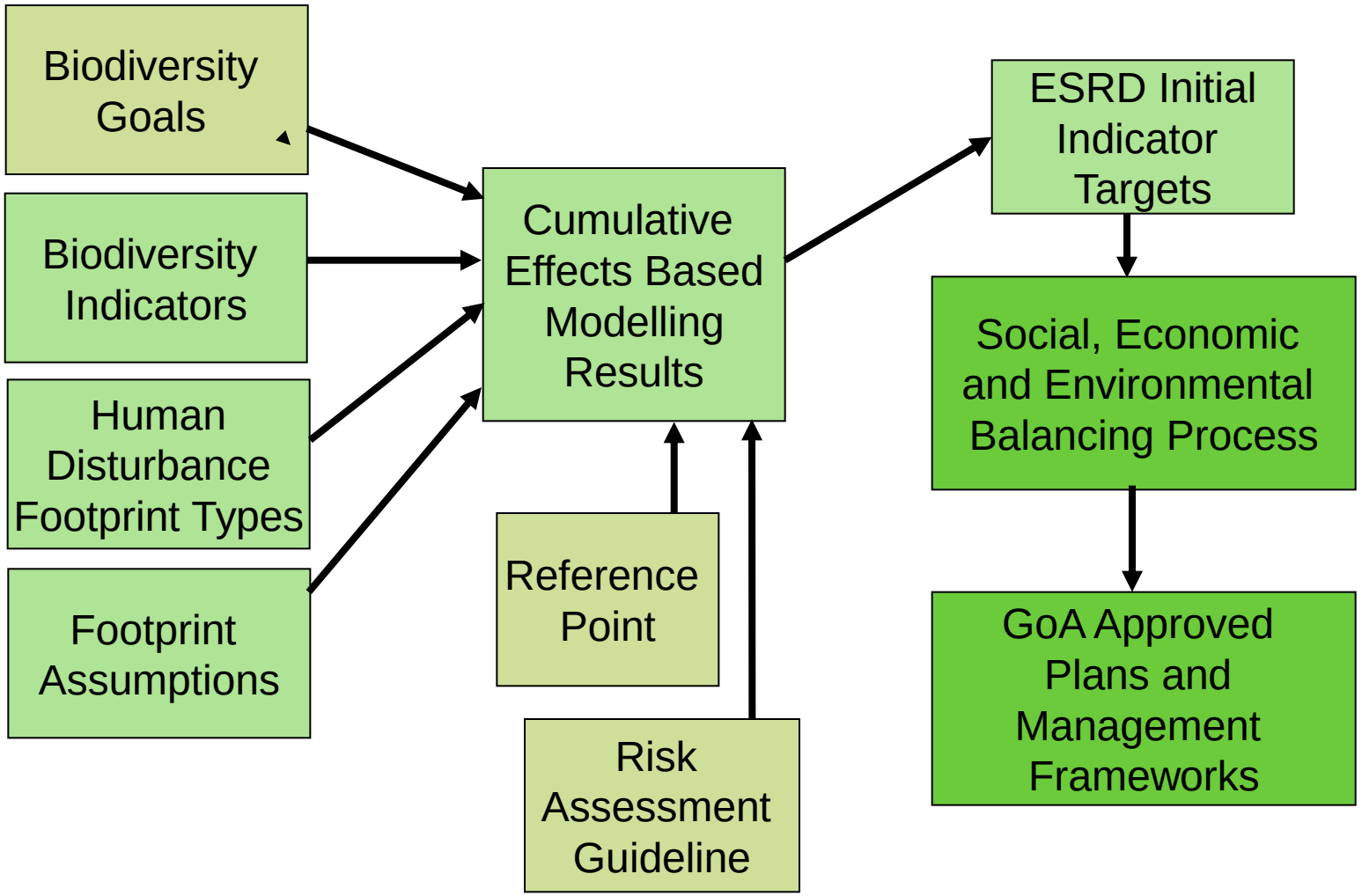
Reverse engineering of the model can be used to determine what land conservation and/or land-use controls would be needed to achieve specific targets.



Proportion of a biodiversity indicator remaining compared to undisturbed (by humans) conditions and risk assessment bands.

Example 4. Indicator model results: ---- Base Case; ---- Development; ---- Best Practices; ---- Approved Trajectory and Target.

Approach Needed for Bringing Biodiversity into Cumulative Effects Based Land-use Planning



Biodiversity Management Framework

- The GoA statement of integrated intent for managing biodiversity within a specific region or subregion.

- Determined by the GoA through the cumulative effects based land-use planning process to balance the economic, environmental and social values (3 pillars).

- Includes the GoA approved biodiversity indicator trajectories and targets to be achieved over a specified time-frame.

- Defines the means of achieving the targets through:
  - establishment of conservation areas,
  - controlling human disturbance footprints,
  - setting footprint reclamation rates and end-points, and
  - controlling public motorized use of the footprints.

Management Frameworks for CE

All MFs for a plan area should be built at the same time and through the same process so they are all fully integrated.

Water Quality and Quantity needs for people, industry and aquatic biodiversity will be different but the MFs should reflect the most sensitive need unless a trade-off has been made.

Air Quality also needs to reflect the needs of people as well as aquatic and terrestrial biodiversity.

A Contaminant MF could list the appropriate compounds known or likely to cause problems in the area and the concentrations of concern to humans and biodiversity.