

# Process for Developing a Targeted and Climate Resilient Natural Resource Damage Restoration Project

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## Background

### Natural Resource Damage Assessment

- Natural Resource Damage (NRD):<sup>1</sup> The responsible party compensates the public for losses resulting from the unpermitted release of hazardous substances or oil.
- Losses (injury) are defined as measurable, observable adverse effects on natural resources and their services.
- Compensation is achieved through a settlement with the federal, state, and/or tribal entities (collectively, the trustees) that manage the natural resources affected.

- Settlement usually takes one of two forms:
  - Restoration completed by the responsible party
  - Funds from the responsible party for the trustees to implement a restoration

### Leveraging NRD (Gibbs and Johns 2023)

- Habitat alteration due to climate change is expected to be significant, especially for species with highly specialized habitat requirements.
- NRD is a mechanism to achieve near-term restoration. The process is most efficient when injury assessment and restoration project development occur simultaneously.

<sup>1</sup> NRD is described in 43 Code of Federal Regulations Part 11 and is pursued under the Comprehensive Environmental Response, Compensation, and Liability Act; Clean Water Act; or Oil Pollution Act.

## Approach

- NRD restoration projects are developed through a general, stepwise process (Figure 1).
- A climate-focused approach seeks to mitigate or eliminate non-chemical stressors.
- The proposed framework offers more opportunity for creativity and efficiency than the business as usual, stepwise process (Figure 2).

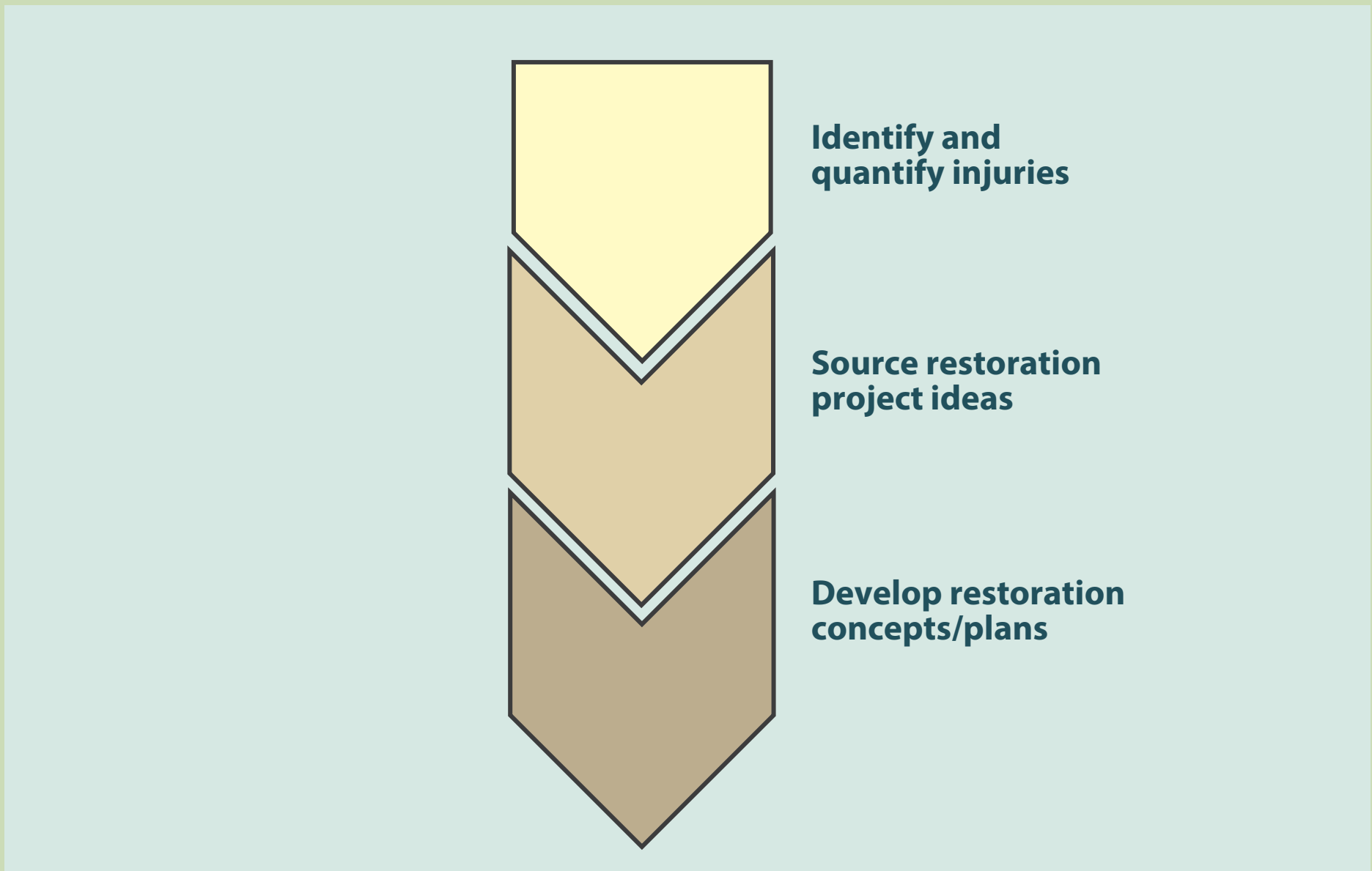


Figure 1. Typical NRD restoration development process.

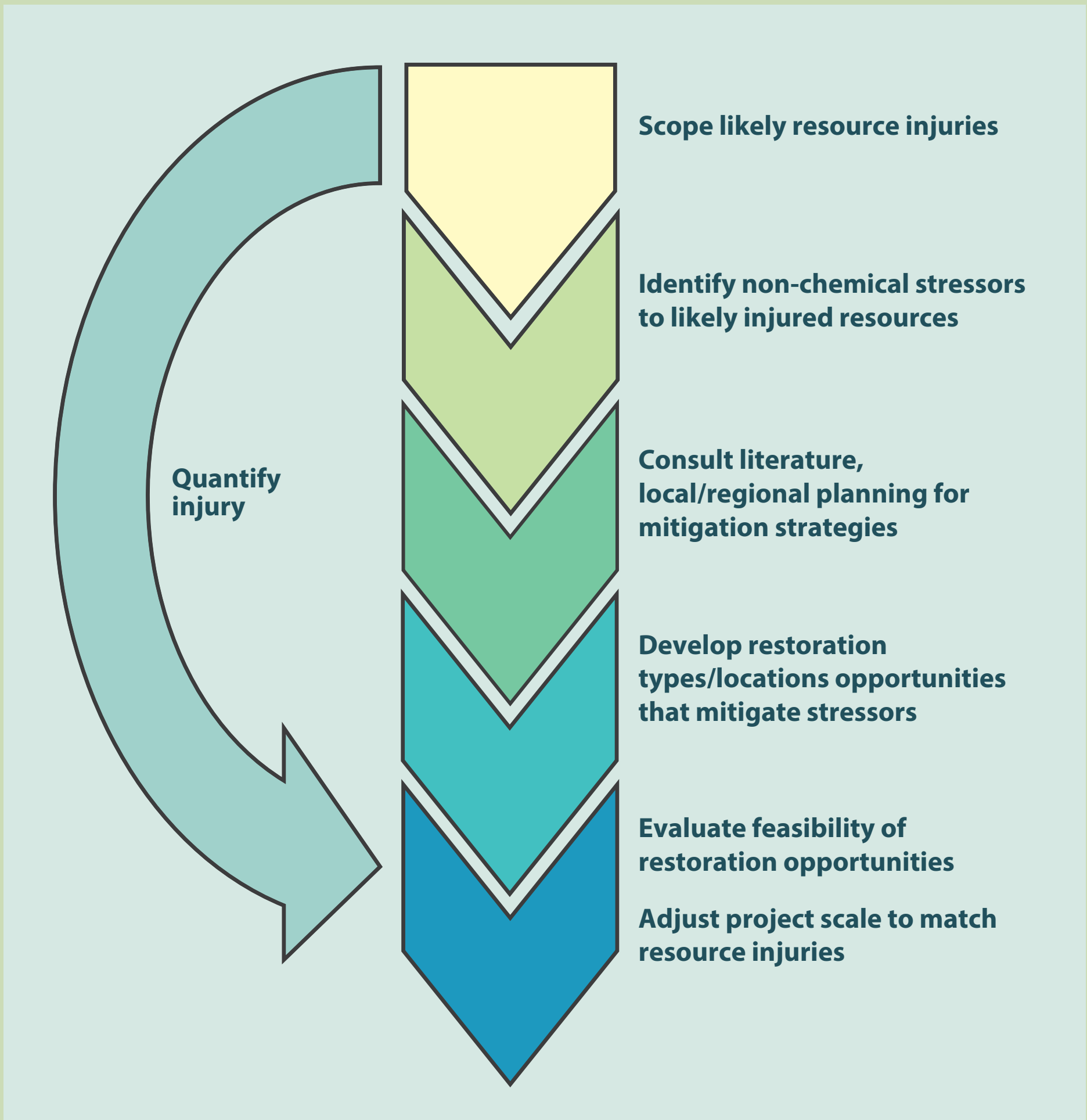
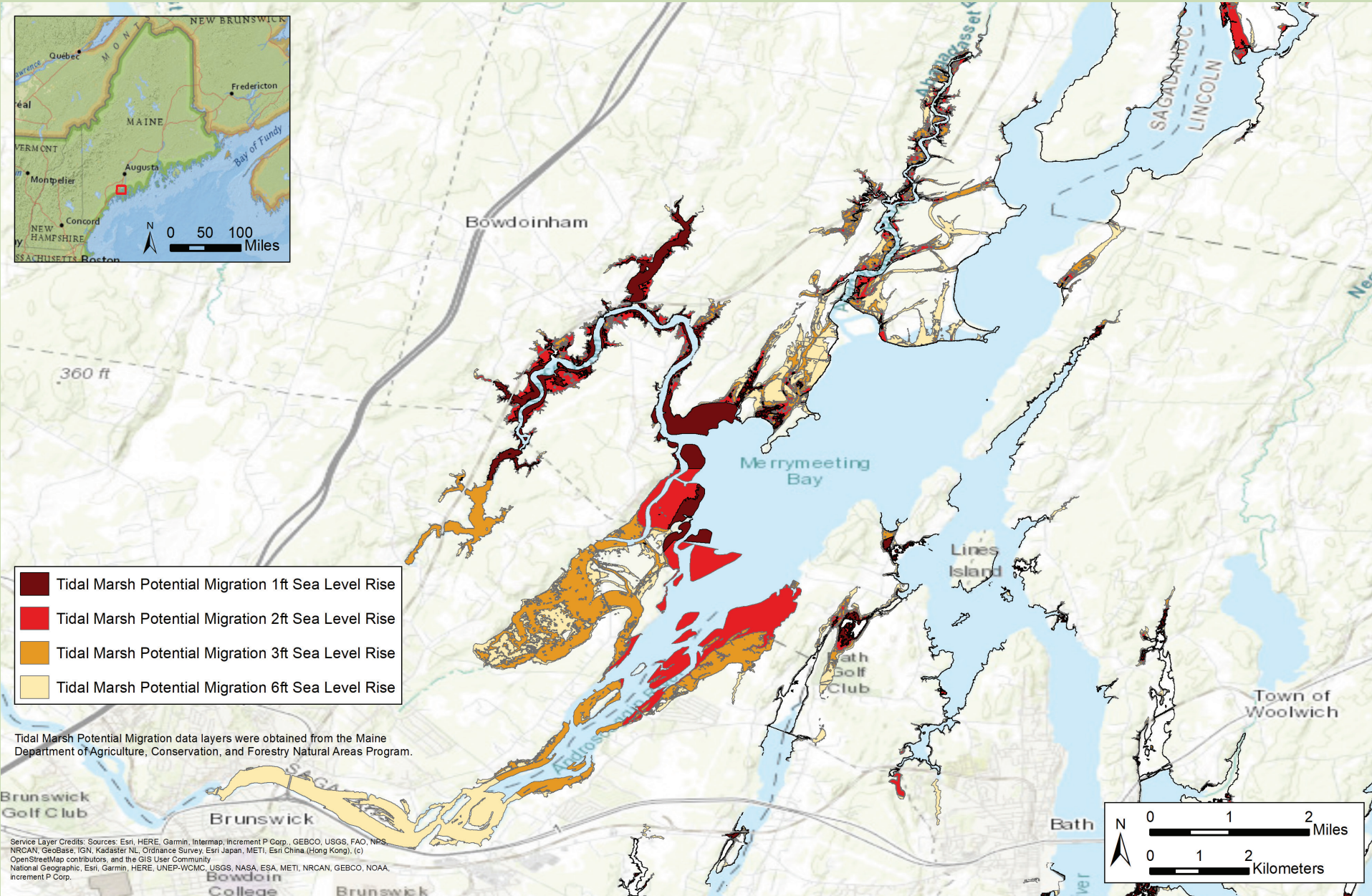


Figure 2. Climate-resiliency focused NRD restoration development framework.

### Case Study

- Potential NRD injuries (benthic community, fish, marsh birds, recreational fishing) exist from historical releases in a coastal river with multiple fringe marshes.
- High marsh-nesting birds, like the Nelson’s sparrow (Map 1), are potentially injured by an unpermitted release.
- Nelson’s sparrow is particularly vulnerable to sea level rise (Figure 3), as it builds nests in a narrow band of shallow water on the edges of marshes.
- Primary non-chemical stressors to Nelson’s sparrow are as follows (Klingbeil et al. 2021):
  - Nest flooding (Figure 4)
  - Nest predation
  - Habitat loss
  - Invasive wetland grasses



Map 1. Map of predicted sea level rise encroachment at 1-, 2-, 3-, and 6-ft intervals in marsh areas adjacent to Merrymeeting Bay, Maine (Maine Natural Area Program)



Figure 3. Nelson’s sparrow.



Figure 4. Flooded Nelson’s sparrow nest

## Application

- Using a restoration approach (Figure 2), we have developed a project concept that is climate resilient and scalable to address a range of injuries, including:
  - Primary benefit to high marsh birds
  - Benthic and fish community
  - Recreational access
- Project concept components could include:
  - Land acquisition to serve as a buffer for marsh migration
  - Dredged material fill
  - Dredged material removal
  - Tide control (e.g., tide gates)
  - Invasive grass species removal
  - Native species plantings
  - Improved recreational access opportunities
- The project concept includes a flexible design (e.g., number of parcels acquired, acres of marsh restored, size and type of recreational access) to allow trustees to meet calculated injury.

## References

Gibbs AF, Johns DM. 2023. Leveraging natural resource damage assessments in the face of climate change. Integr Environ Assess Manag (in press).

Klingbeil BT, Cohen JB, Correll MD, Rield CR, Hodgman T, Kovach AI, Lentz EE, Olsen BJ, Shriver WG, Wiest WA, Elphick CS. 2021. High uncertainty over the future of tidal marsh birds under current sea-level rise projections. Biodiv Conserv 30:431-443.