Ecology and Economics of Restoration Scaling

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Overview of Presentation

- Project goals
- Explain “restoration scaling”
- Habitat Equivalency Analysis (HEA) vs. Resource Equivalency Analysis (REA)
- HEA/REA methods and applications
  - Ecological
  - Economic
- Results to date
- Application/Implication

Project Goals

- Synthesize
  - case studies and applications
  - relevant published literature
- Draft manuscript on alternative methods
- Solicit peer review of manuscript and revise
- Present workshops to practitioners and potential trustees
- Publish text and syntheses on CRRC website

Manuscript Contents

- I. Introduction to concepts
- II. Ecological injury assessment
  - A. Habitats – e.g., marsh, mangroves, oyster reef, SAV, kelp, mud flat, coral reef, river bottom
  - B. Resources – e.g., benthos, birds, fish, turtles
- III. Scaling and valuing alternative restorations
- IV. Human use (service) losses
- V. Discounting past and future services
- VI. Habitat and resource conversions
- VII. Future needs

Habitat connections

Coastal Response Research Center

University of New Hampshire

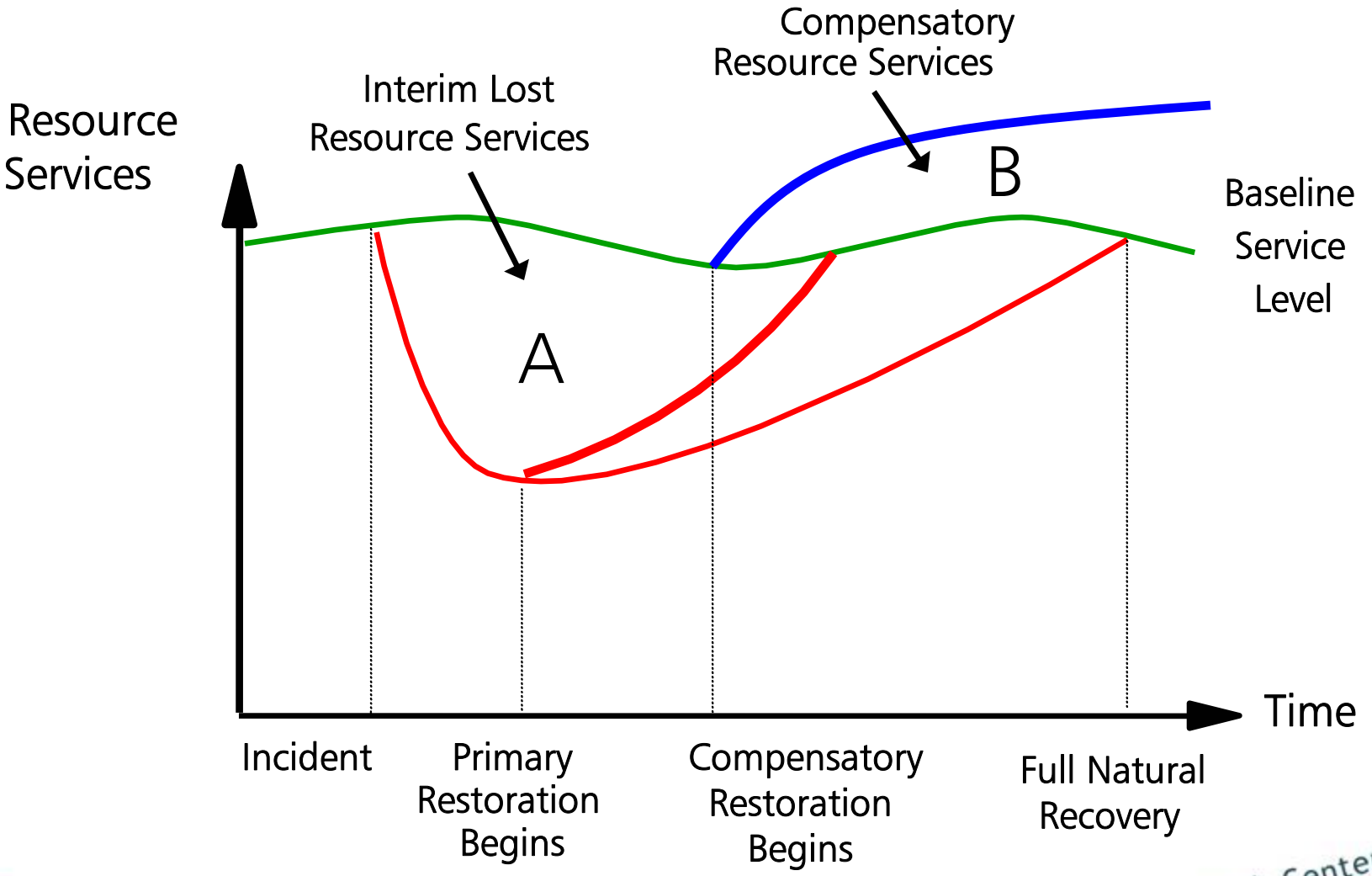
NOAA

Coastal Response Research Center

The Essential Terminology

- “Injury”
- “Service flows” to ecosystem and human uses
- “Baseline”
- “Primary restoration”
- “Interim losses”
- “Restore the equivalent”
- “Compensatory restoration”

Restoration Scaling



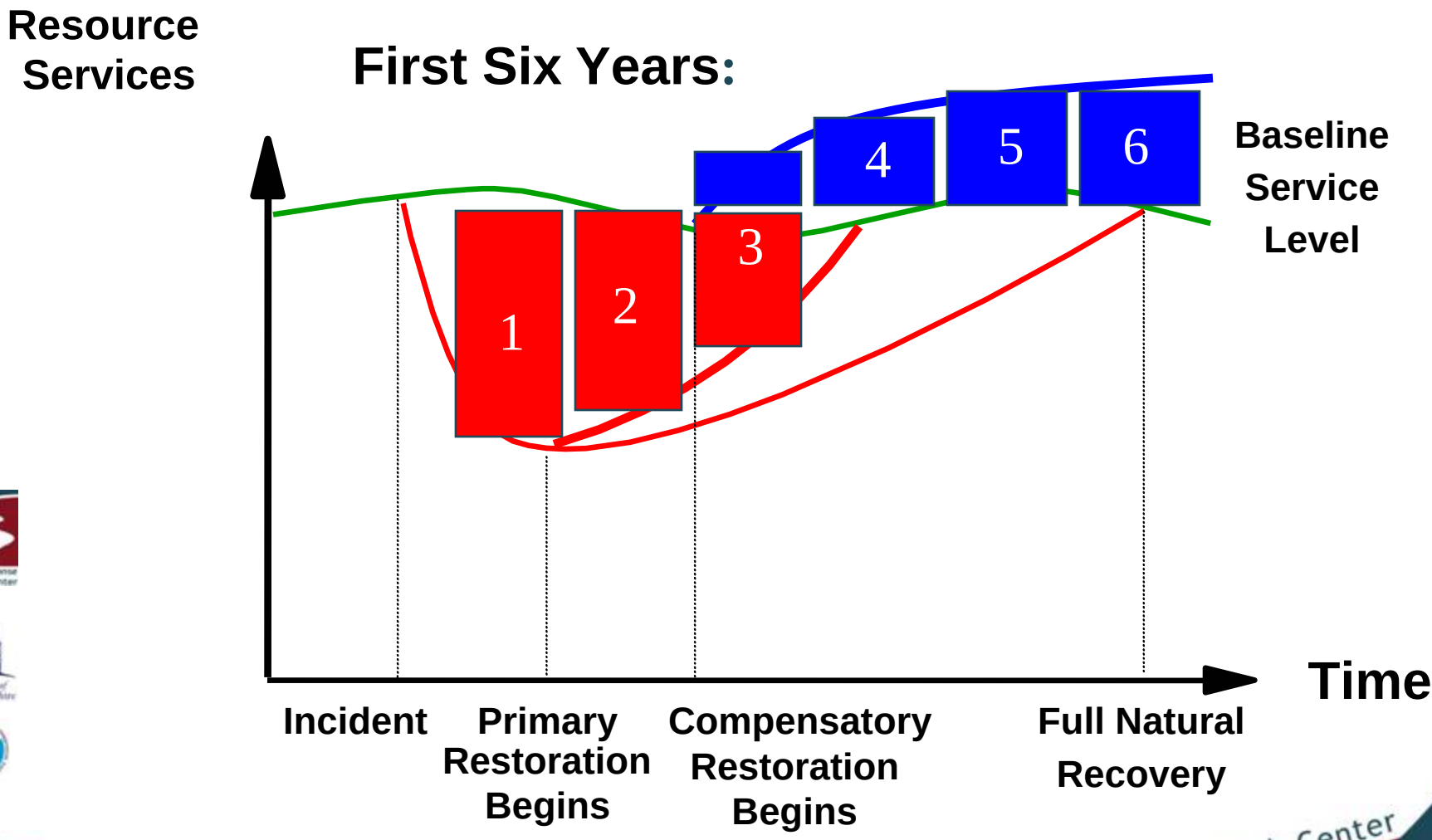
Measuring Resource Services

- Losses from injury and gains from restoration must be quantified
- Services may be quantified directly in REA
  - e.g., bird mortality
- Metrics may be selected to represent habitat function in HEA
  - e.g., stem density and height of *Spartina* as proxy for marsh ecosystem services; density of benthic invertebrates in contaminated sediments
- Human use losses (economics)
  - e.g., quantified directly, stated preference, consumer surplus

Determining Annual Service Flows

- Success of restoration actions is predicted based on past experience
- Recovery of injured resources can be monitored through time
- Losses and gains in services can be plotted on an annual basis
- Discounted values of losses and gains must be equal to achieve compensatory restoration

Annual Service Flows



Results to Date

- Syntheses
  - 52 case studies (pdfs) in database
  - 325 published literature pdfs in database
- Manuscript – 70% complete (101 pp)
- Peer review – in late summer
- Workshops
  - Dec 2007 - NOAA at CRRC on marsh metrics
  - Nov 2008 – SETAC short course – Tampa
- Publications – CRRC website in 2009

Application/Implication

- **Single comprehensive source document for:**
  - **Current and future trustees of natural resources**
  - **NOAA staff, RPs, attorneys, consulting scientists**
  - **NGO environmental groups and general public**
- **Improves efficiency, uniformity, and effectiveness of restoration**
- **Promotes scientific scrutiny to advance restoration practice and methods**
- **Informs EU as it adopts this approach**

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www.crrc.unh.edu

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