

A large flock of white swans is gathered in a shallow wetland area. The swans are densely packed in the foreground and middle ground, extending towards the background. The water is a light blue color. In the background, there are several brown, rocky mountains under a clear blue sky. The overall scene is a natural, arid wetland environment.

LMRD – REGION 2
Featured Ecosystem -
Arid Wetland and Riparian Areas

John Vradenburg
Bosque del Apache National Wildlife Refuge

Program Emphasis

- **Wetland restoration and management techniques.**
- **Investigation and restoration of river fluvial processes**
- **Riparian restoration and management**
- **Invasive species control**
- **Xeric community restoration**
- **Habitat based management and planning to meet life history requirements for migratory birds over large landscapes.**

Why Arid Wetland and Riparian Systems?



Wetlands represent less than 2% of land cover in the southwestern United States.

Arid Southwestern Wetlands Oasis in the Desert

- **irrigation and flood control developments on all major rivers impact wetlands.**
- **Flood timing, duration, amplitude, and sediment dynamics - highly modified.**
- **Channel movement - constricted by levee systems**
- **Artificial wetland impoundments have replaced historic wetland habitats.**
- **Challenges of restoration and mgmt typify wetland habitats throughout the southwest.**
- **Invasive plants have displaced native vegetation**

Global Climate Change

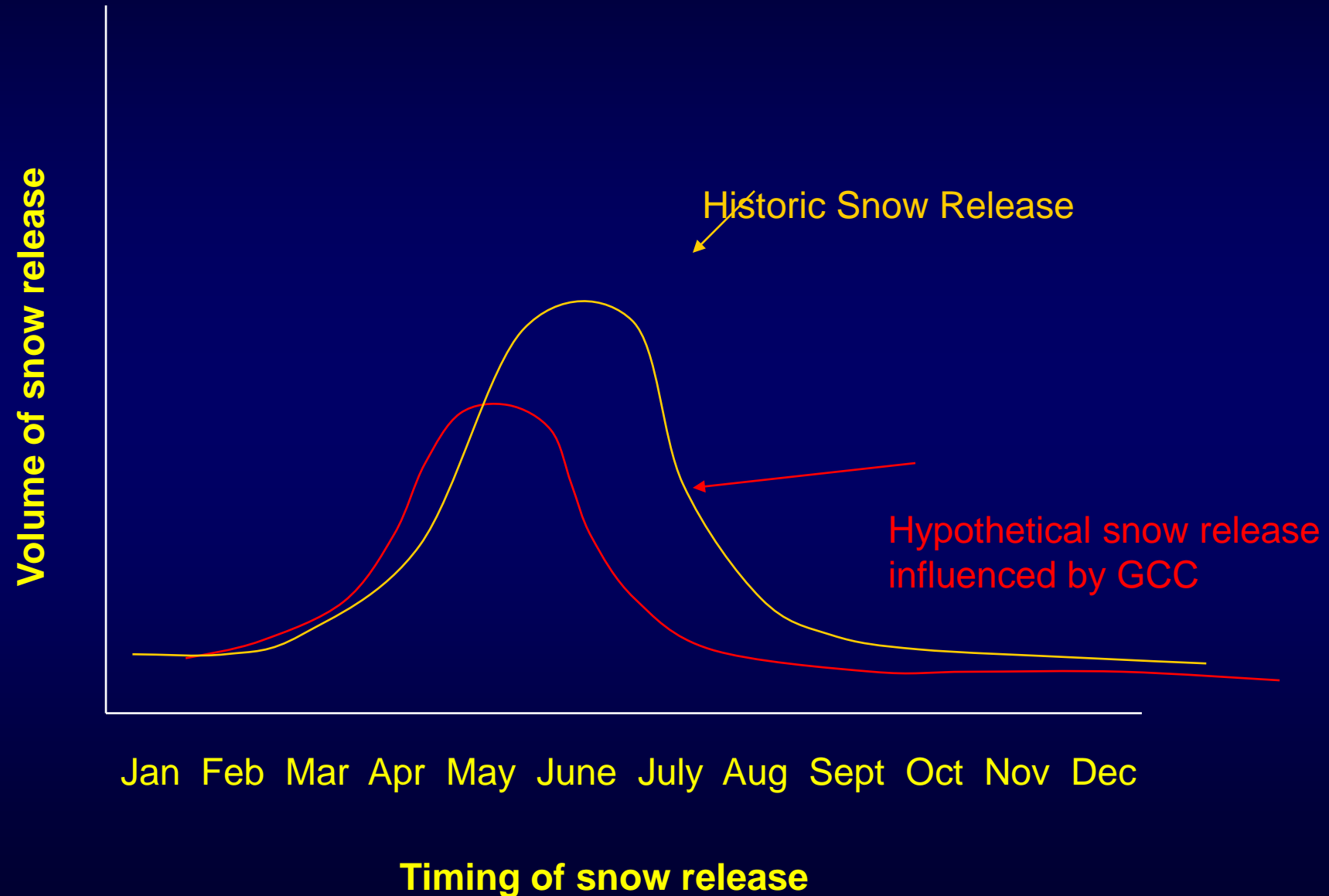
- **Predictions vary in time and space**
- **Despite variability concerns include changes to:**
 - **timing, type, amount of precipitation**
 - **duration, volume, release of snow pack**

Global Climate Change

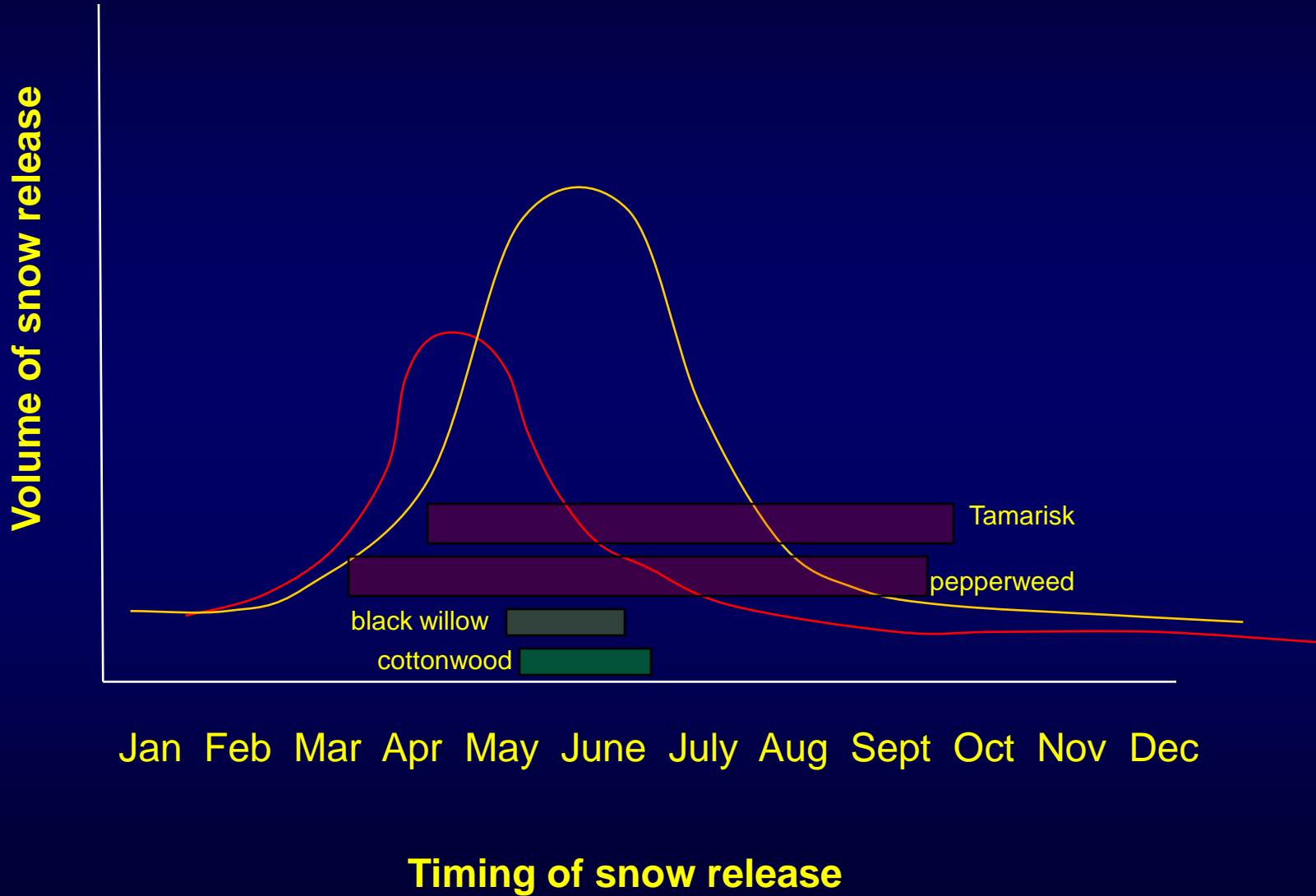
Alteration of hydrologic features have environmental and social impacts including

- Shifts in plant community (native and exotic)**
- Subsequent changes in wildlife values**
- Availability of water for land management (conservation and agricultural)**

Comparison of snow pack accumulations and timing of snow pack release historically and based on predictions of changes influenced by global climate change in the southern Rocky Mountains



Comparison of the reproductive periods of native plant (cottonwood and black willow) and non-native plant species under natural snow release timing and the predicted snow release timing resulting from global climate change



What Are We Doing?

- **Increasing research emphasis to hydrologic studies across broad landscapes**
- **Evaluating value of carbon sequestration in arid systems**
- **Investigating land management techniques that reduce carbon footprint**

What Are We Doing?

- **Establishing mechanism to secure water rights for private, federal, and state managed lands**
- **Working with water management community to establish conservation water releases during the growing season to benefit riparian plant communities**

The Problem – Invasive vegetation altered hydrology

Management

Restoration

(Local, Regional, Continental)

Demonstration

(Publications,
Workshops &
Biological
Consultations)

Research

(State, Federal,
Universities, Mexico)

