

Effects of Climate Change and Reservoir Operations on Riparian Vegetation

Gap(s) Addressed

Gap Number 4.07: “Understanding on how climate change may impact riparian ecosystems and vegetation that affect both longer-term water budgets and ecological resources.”



Research Question(s)

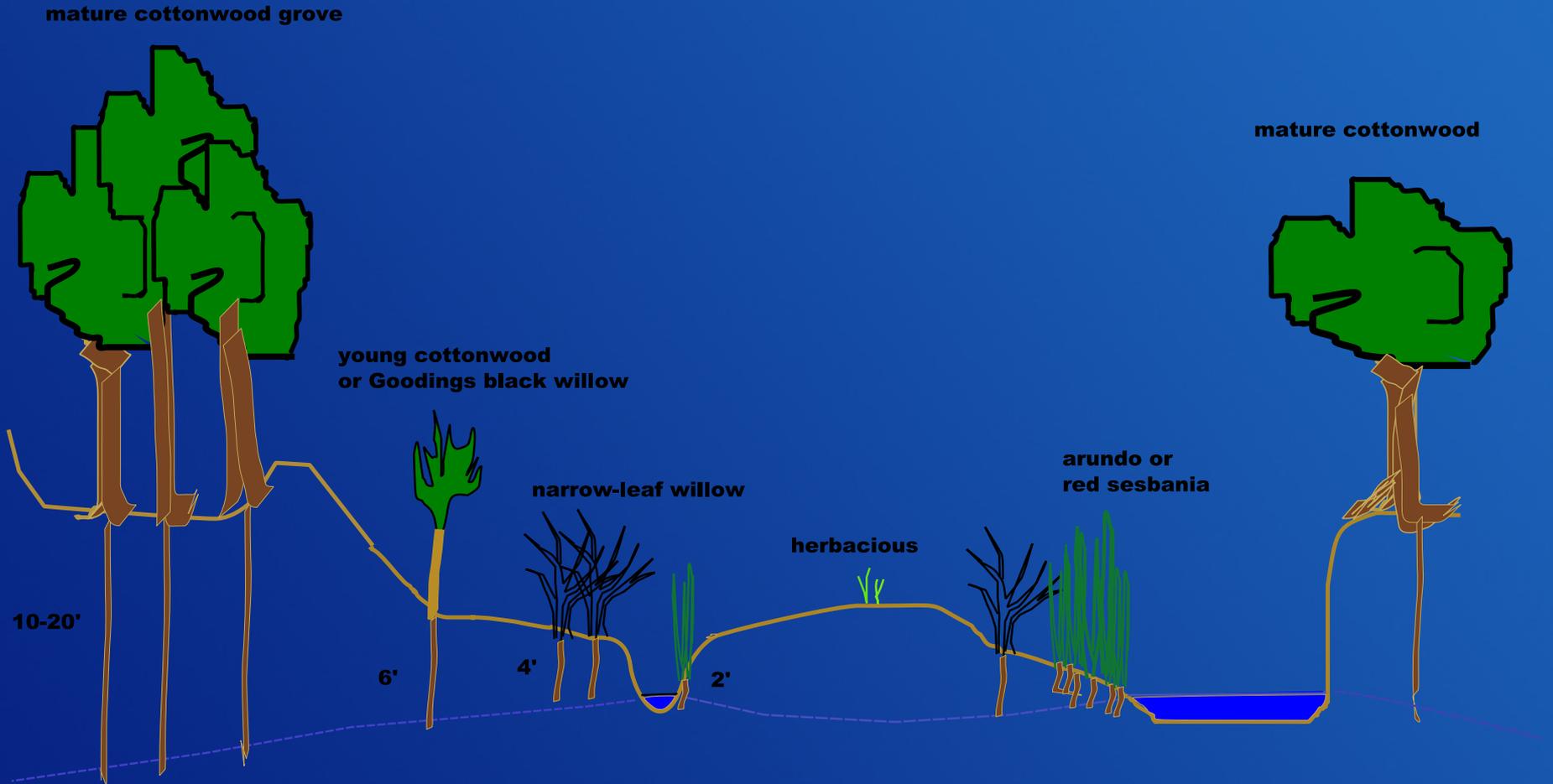
1. What is the potential range of effects of future climate changes on the establishment and sustainability of riparian forests in managed river systems?
2. What set of reservoir operations can be used to encourage successful native vegetation recruitment and survival under projected climate changes?
3. Can reservoir operations be used to control other potential indirect effects such as invasive species?

Collaborators/Schedule/Source of Support

- COE – funding to integrate vegetation module into HEC-RAS
- USFS – Fort Collins, CO
- Research begun in FY14

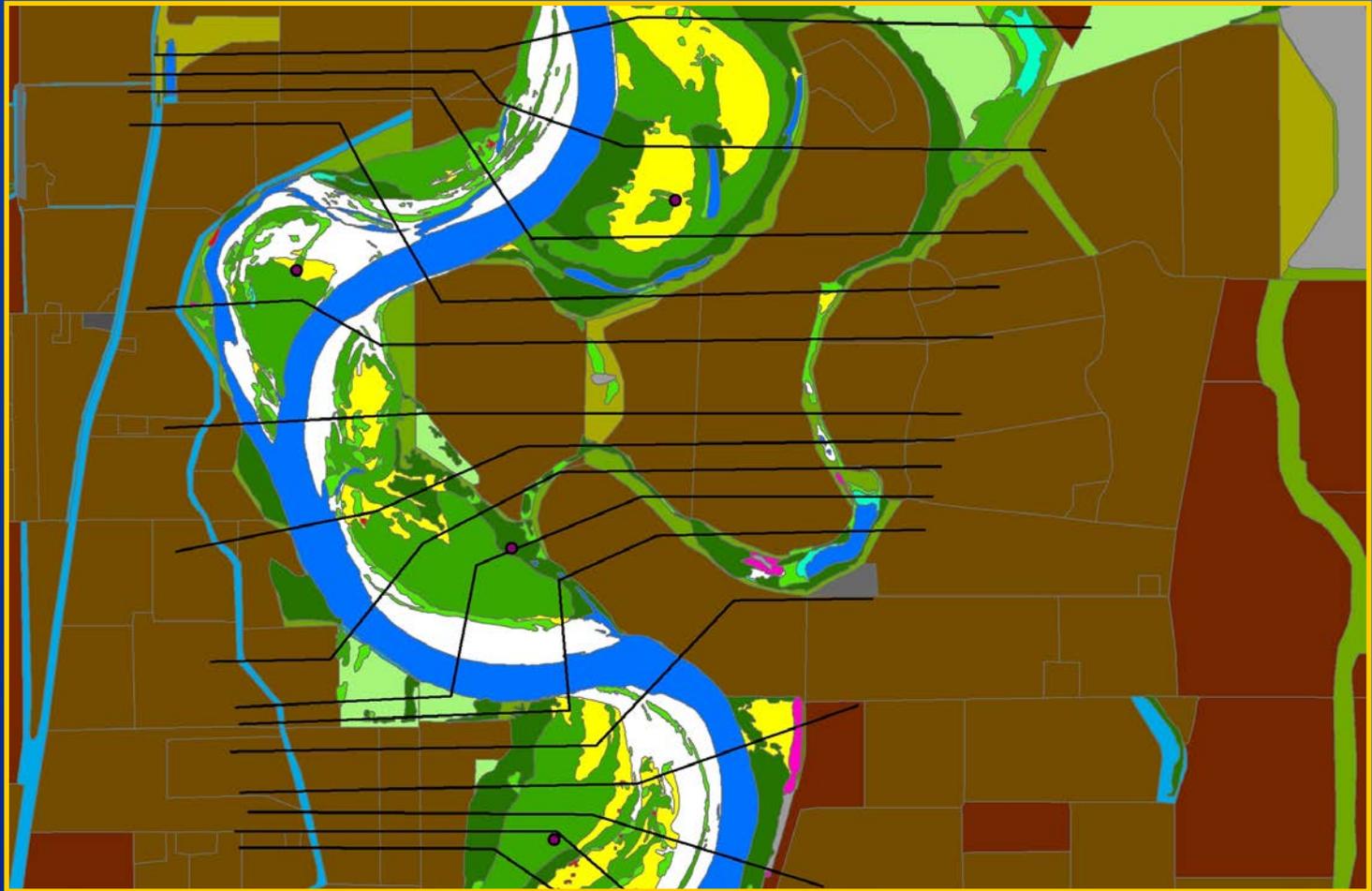
RECLAMATION

Conceptual representation of flow and riparian vegetation (cross section view)



RECLAMATION

Conceptual representation of flow and riparian vegetation (Plan view)



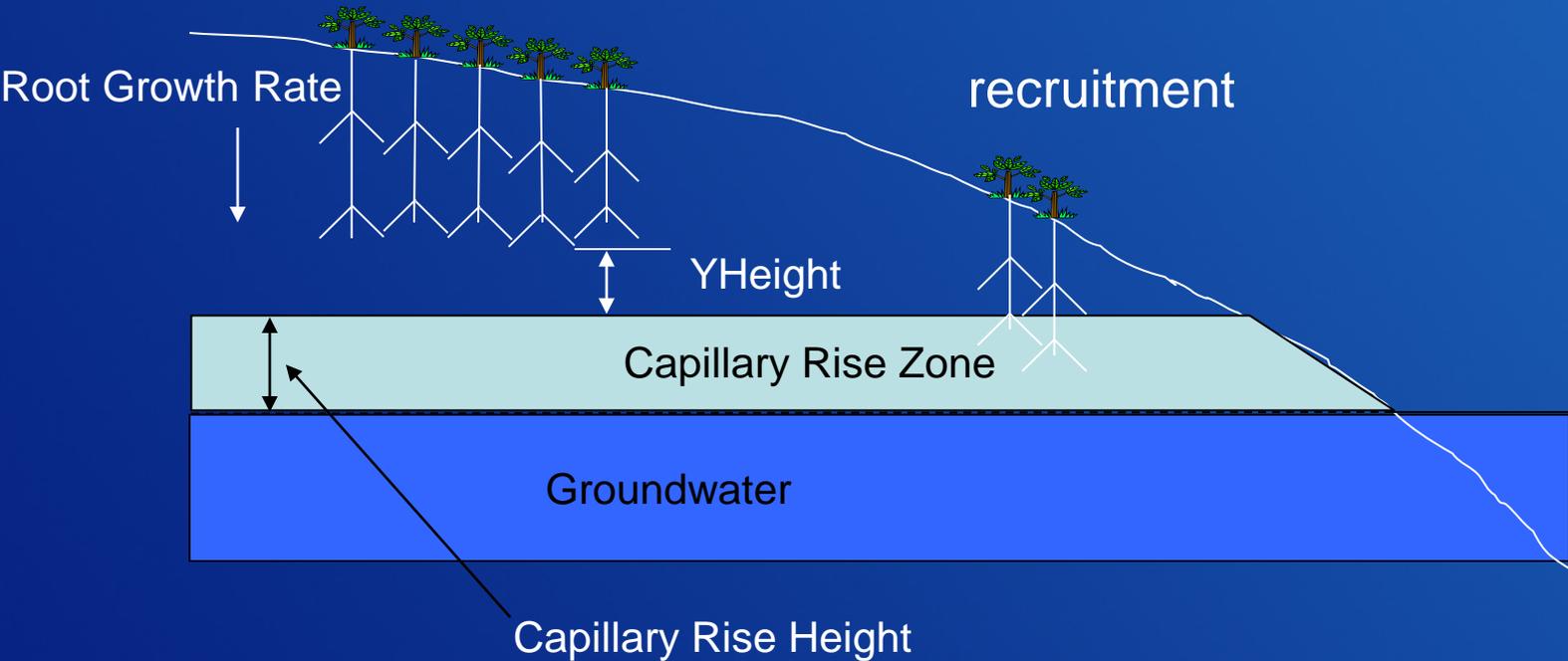
RECLAMATION

SRH-1DV Recruitment Model

desiccation

recruitment

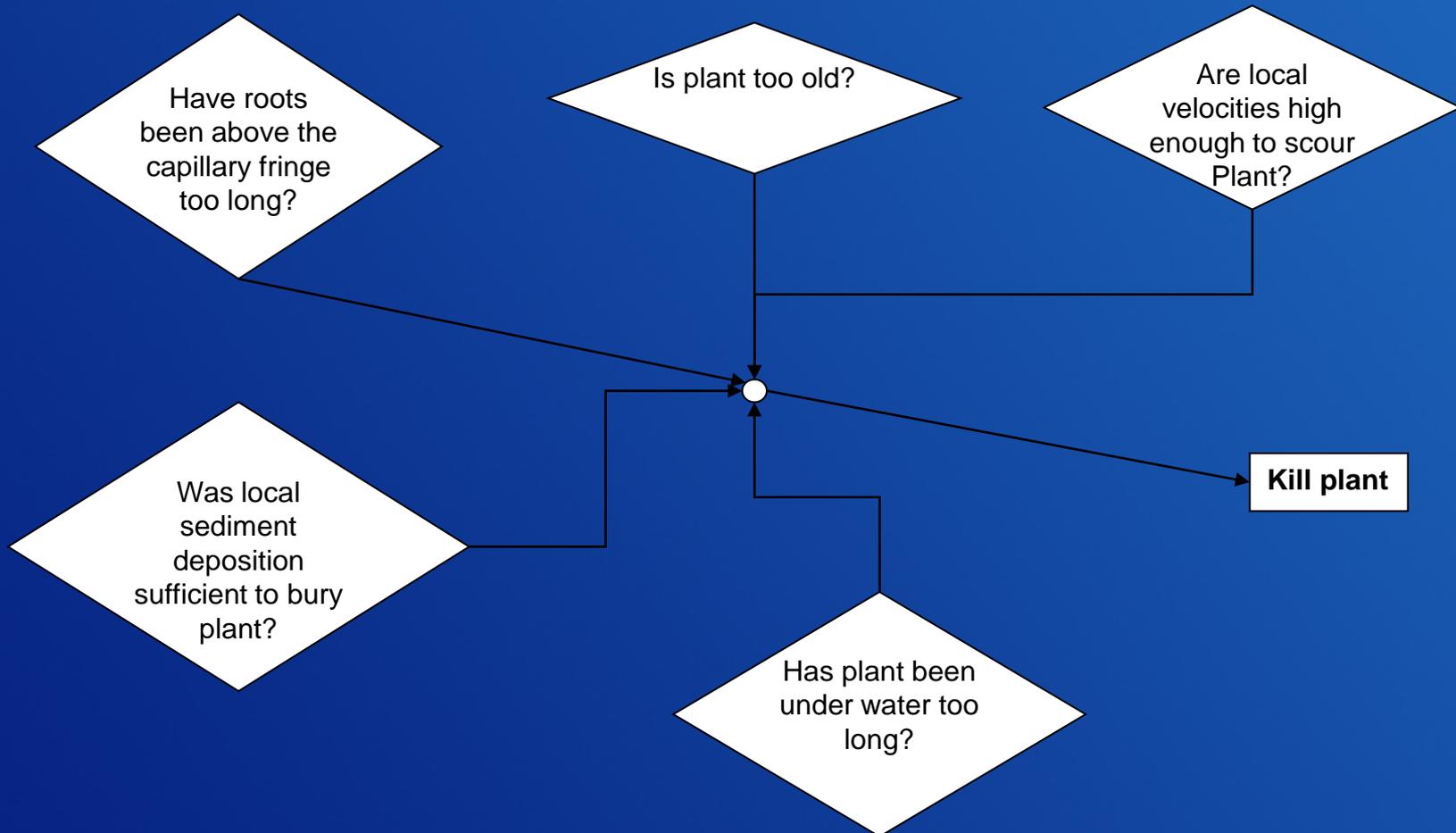
Root Growth Rate



RECLAMATION

SRH-1DV Vegetation Model: Mortality

Mortality Module



Effects of Climate Change and Reservoir Operations on Riparian Vegetation

Summary

- Integrate Hydraulic, Sediment Transport models with rule based simulation of riparian vegetation
- Riparian vegetation module has already been integrated and used in SRH-1DV (www.usbr.gov/pmts/sediment)
- Applications to San Joaquin River Restoration Program, Rio Grande Maintenance, Sacramento River

Key Lessons Learned

- Currently have valuable tool in analyzing reservoir operations and river reach potential for riparian vegetation
- Need to better understand plant dynamics and response to climate

Next Steps/Future Work

- Research meeting in February with staff of COE, USFS, MP region to discuss best methods to represent:
 - Climate effects
 - Competition between species and vegetation succession

