

Managed Wetland/Waterfowl Hunting Impact Analysis





Managed Wetlands



Winter Flooded Rice





Background and Process

- Conversations with RD 108 prior to FR
- Development of proposed project included in FF portfolio
- Proposal submitted to CVJV
- Stakeholder experience with Yolo BNP analysis deficiencies
- Outreach to wetland managers and hunters
- Biological data
- Ad hoc group meetings (March 8 and April 28, 2023)
- Testing and refinement



Outline

- Mechanisms of impact
- Calculating impacts – developing a score
- Testing the calculation
- Conclusions



Flood Impacts

- Bird use
- Landowner/hunter access
- Infrastructure maintenance
- Wetland management for duck food





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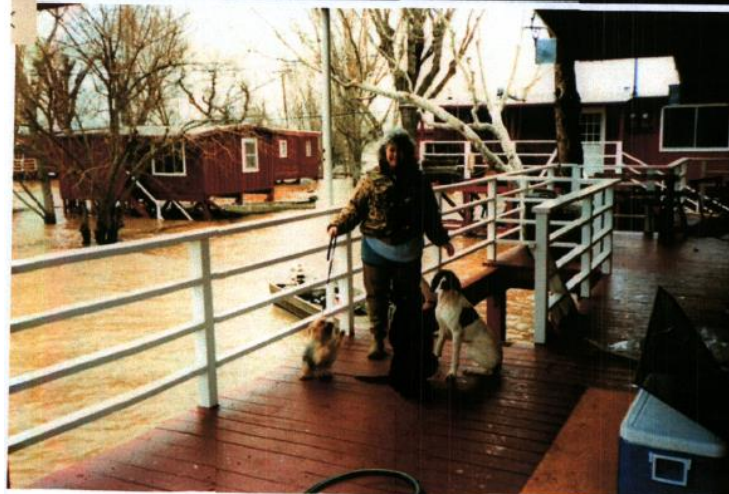
Group	Land Cover Class	Flooding Status	Depth	Season
Shorebirds (non-breeding)	Managed wetlands, rice, grain corn, field & row crops	Must be flooded	< 4 inches (~10cm)	July 1 - May 15
Waterfowl* (non-breeding)	Managed seasonal wetlands, rice, grain corn	Managed wetlands and rice must be flooded	< 12 inches (~30 cm)	Aug 15 - Mar 31
Cranes (roosting)	Managed wetlands, rice, corn, wheat, pasture	Must be flooded	< 8 inches (~20 cm)	Oct 1 - Mar 15
Cranes (foraging)	Primarily rice, corn, wheat within 5km of known roost	Dry or very shallow (e.g. leading edge of flood-up)	< 2 inches (~5 cm)	Oct 1 - Mar 15

*emphasis on dabbling ducks (over geese, diving ducks)



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Impact Equation

Impact Score Factors:

- 1) Depth: How deep is the flood?
- 2) Timing: When is the flood?
- 3) Flood Area: How extensive is the flood?



Impact Equation

Daily Evaluation of...

Flood Depth

Flood Timing

Flood Area



Impact Equation

Flood Depth

Flood Timing

Flood Area

Impact	Depth		Depth Multiplier(ω) Hunting	Depth Multiplier(ω) Management
	Winter Flooded Rice	Managed Wetlands		
No impact	< 12"	< 12"	0	0
Bird use declines	12"-14"	12"-22"	1.5	0*
Access reduced	14"-20"	22"-28"	2.5	2.5
Infrastructure damage	>20"	>28"	5.0	5.0

* Bird use is captured with bioenergetic models during this period



Impact Equation

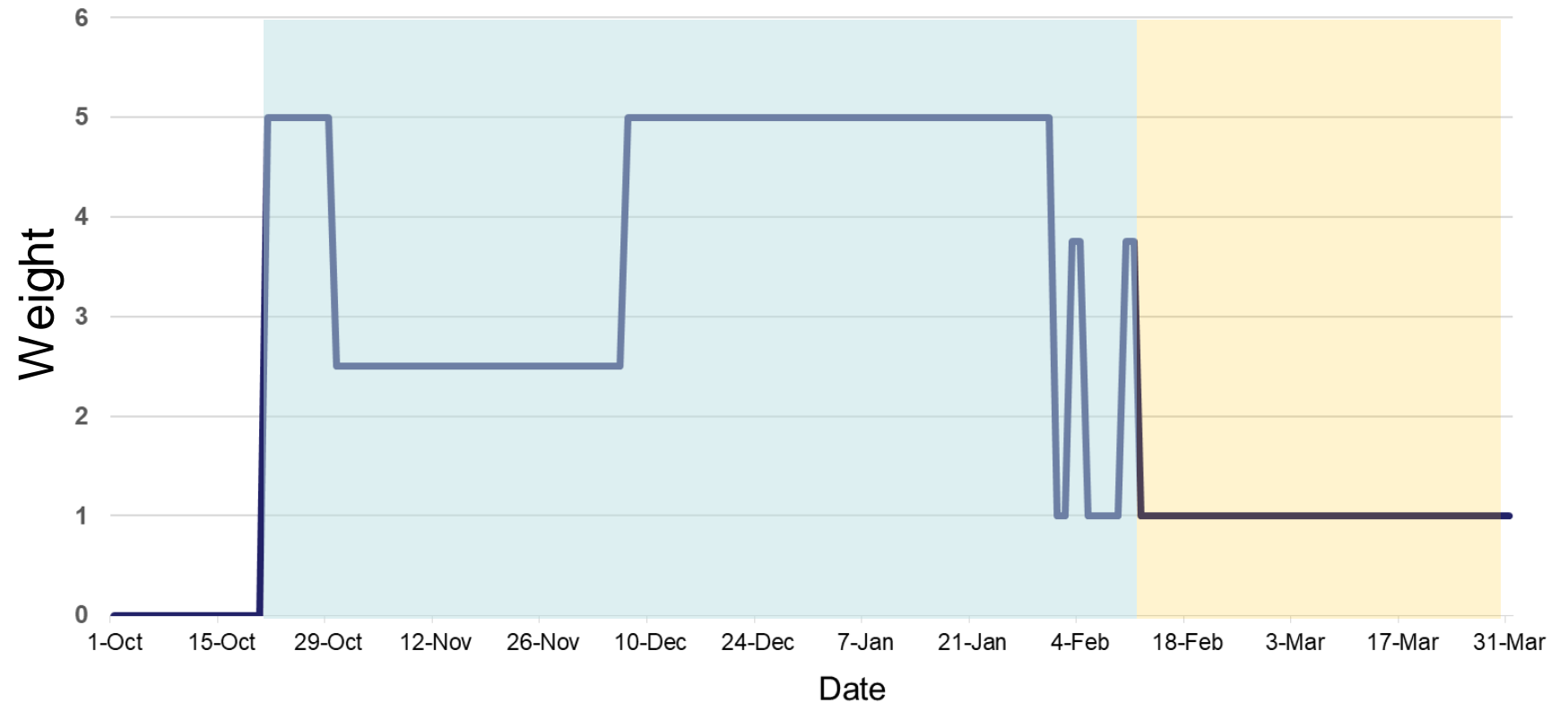
- Waterfowl Hunting Season
- Wetland Management*

Day Value

Flood Depth

Flood Timing

Flood Area



*Example field that has target drawdown of March 31st

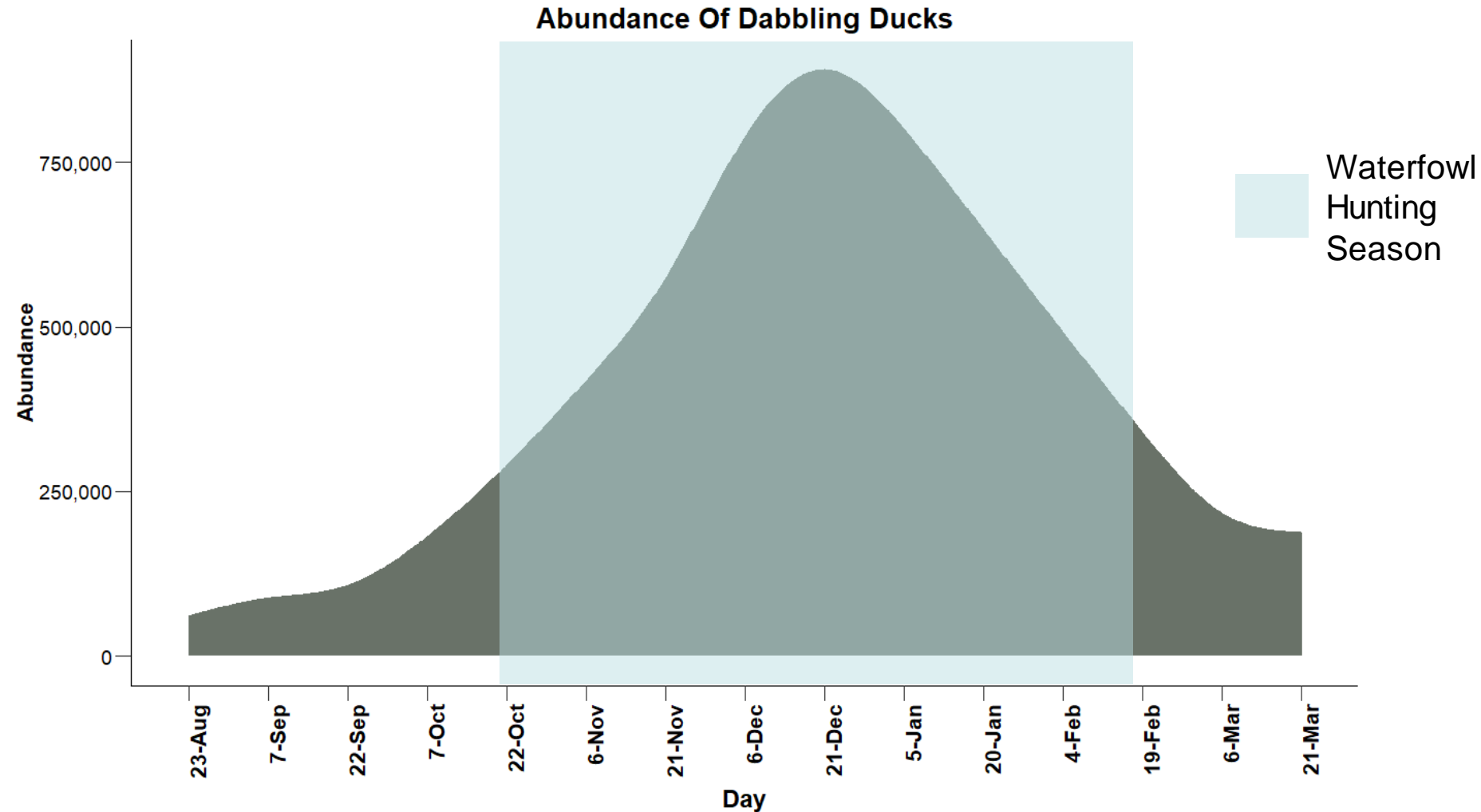


Impact Equation

Flood Depth

Flood Timing

Flood Area





Impact Equation

Daily Calculation of Area Impacted

Flood Depth

Flood Timing

Flood Area

Impact	Hectares	
	Winter Flooded Rice	Managed Wetlands
No impact	27,176	14,560
Bird use declines	17	90
Access reduced	15	0
Infrastructure damage	5	0

Example Day



Impact Score Factors:

- 1) Depth: How deep is the flood?
- 2) Timing: When is the flood?
- 3) Flood Area: How extensive is the flood?

A_c = Number of Hectares flooded at each class (c)

ω_c = Class (c) specific multiplier

$$\text{Eq.1} \quad \text{Daily impact score} = \sum_{c=1}^4 A_c * \text{day weight} * \omega_c$$

$$\text{Eq.2} \quad \text{Scaled impact score} = \frac{\sum \text{Daily impact score}}{\text{Total Area}}$$



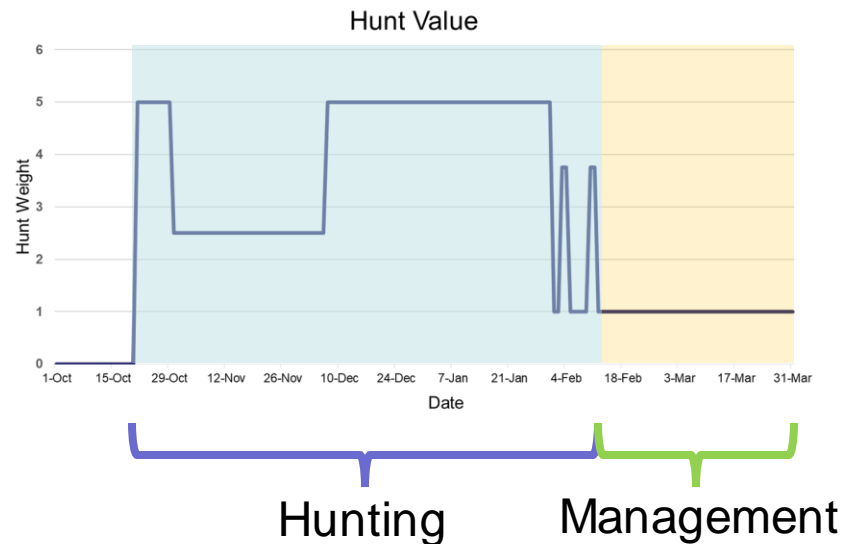
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Area for each habitat type

Importance of the day

Depth multiplier

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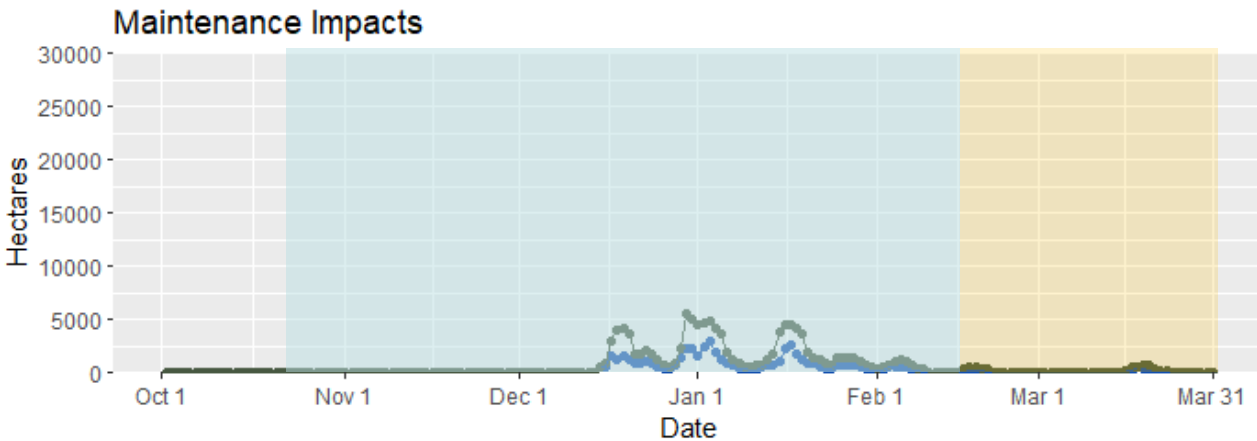
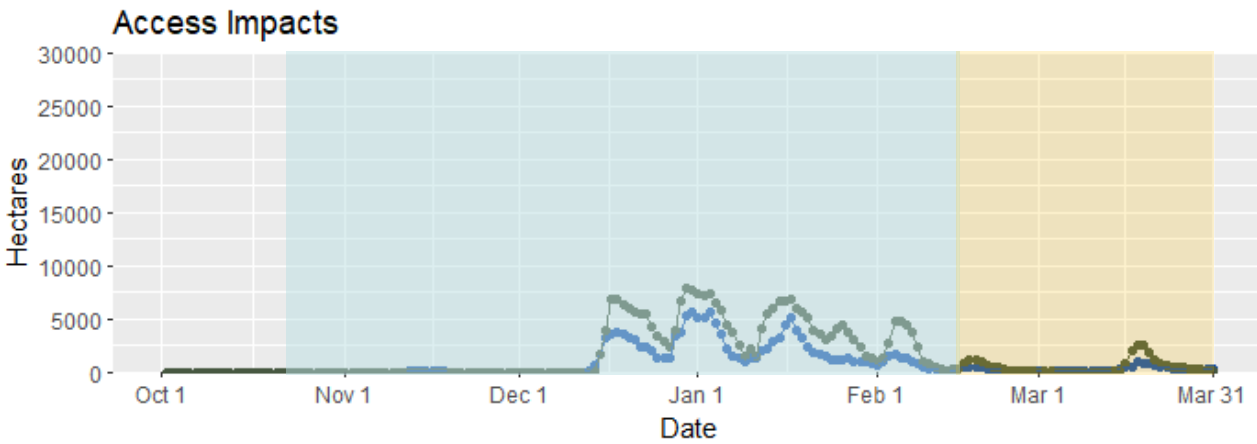
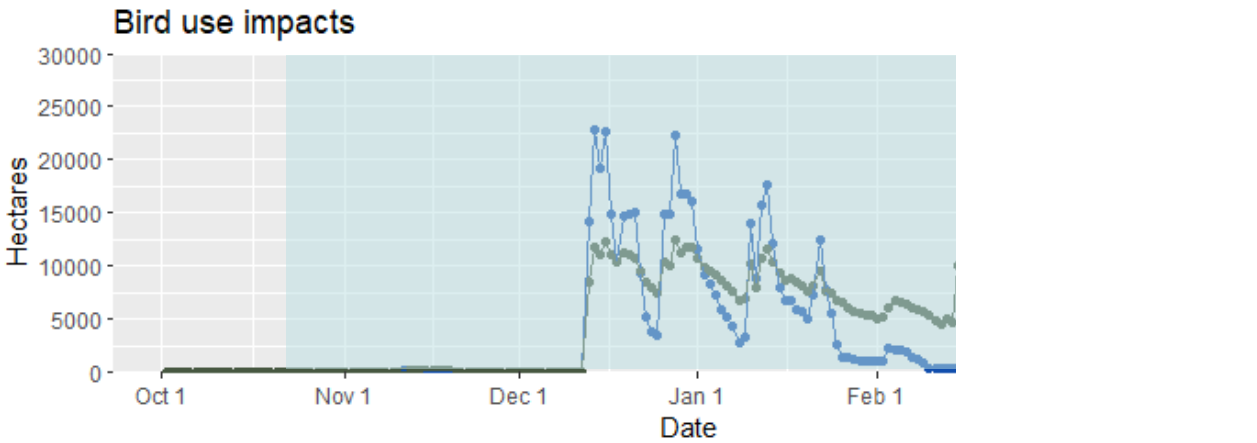
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Butte 2003 Hectares



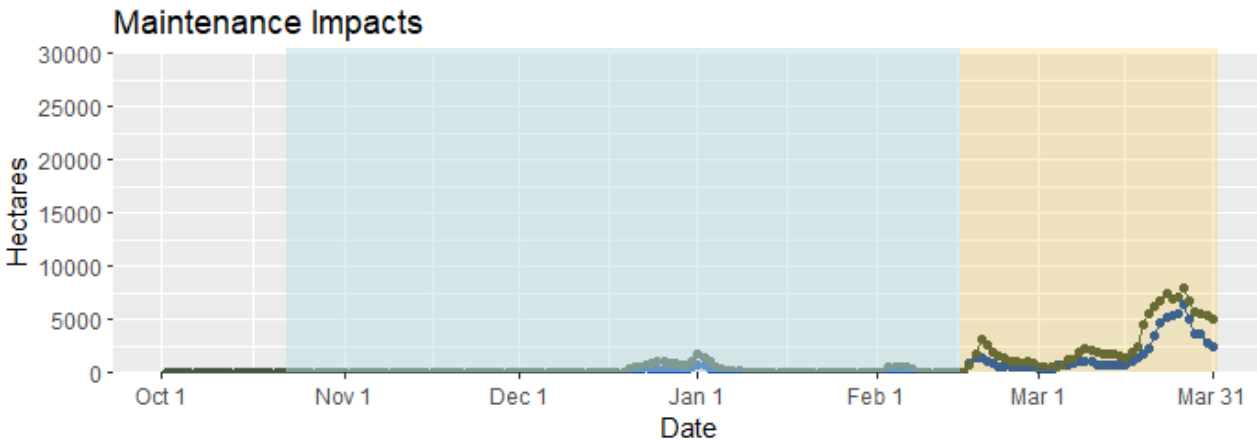
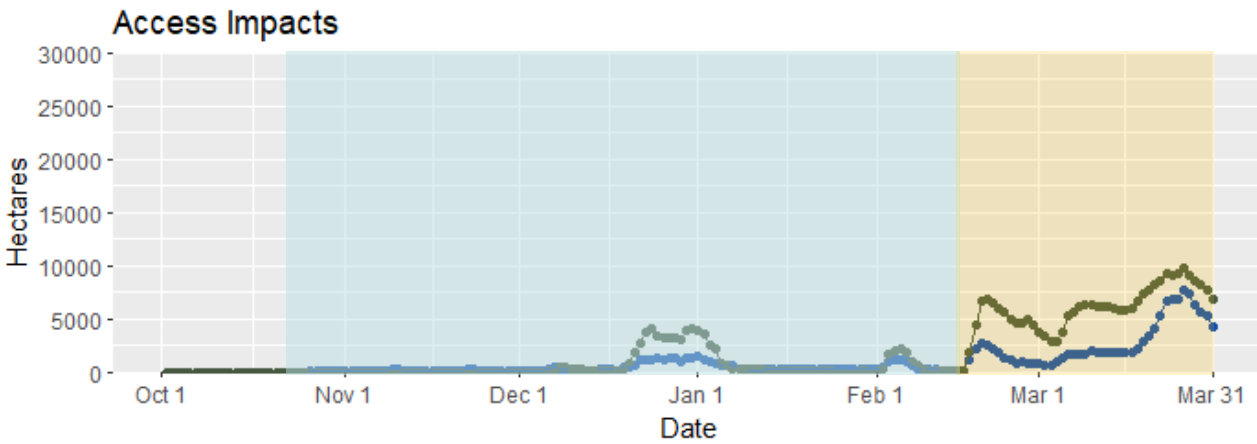
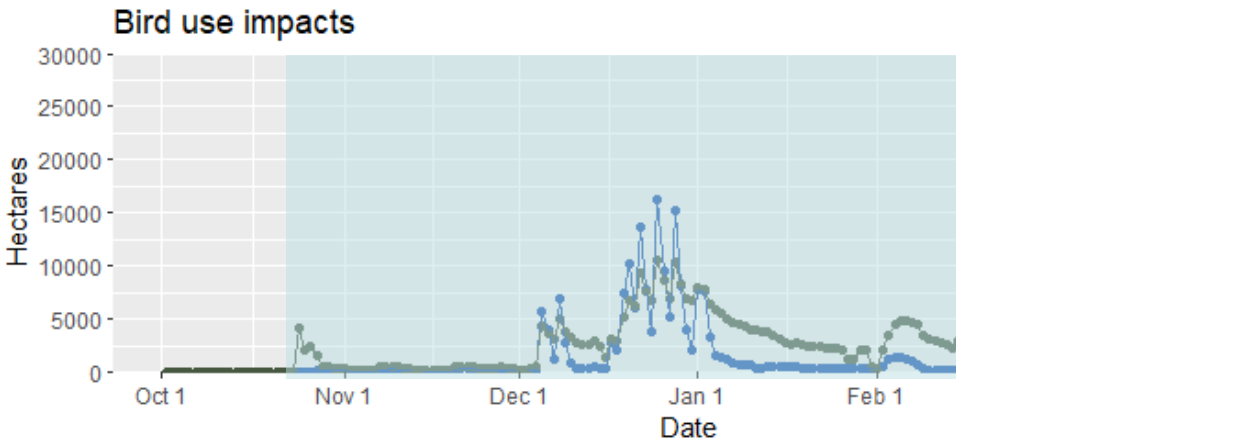
Large Hunting Impact Year

- Multiple (3-4) major flood events during waterfowl season

- Little/No impacts after waterfowl season



Butte 2011 Hectares



Small Hunting Impact Year

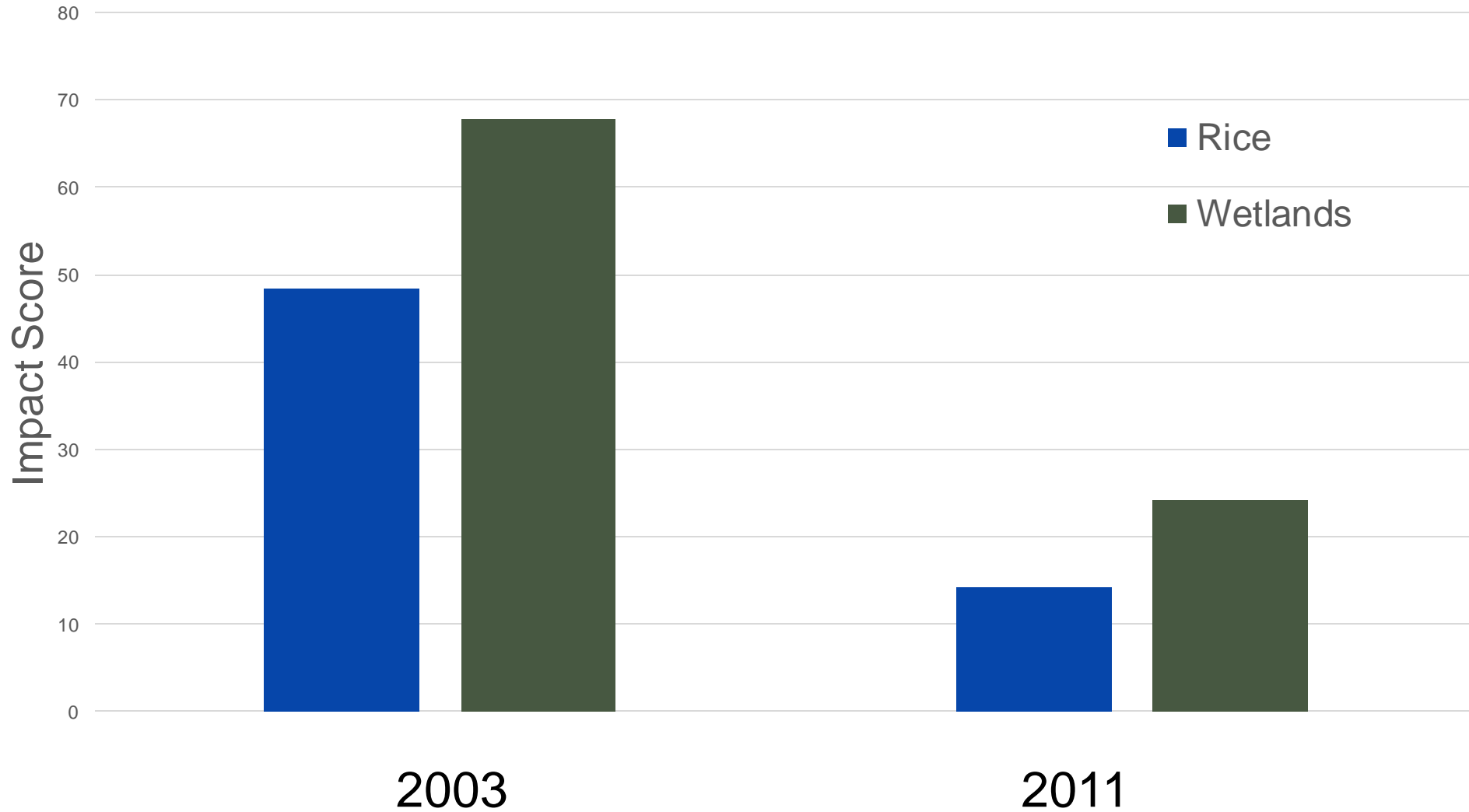
- One major flood event during waterfowl season

- Larger impacts after waterfowl season



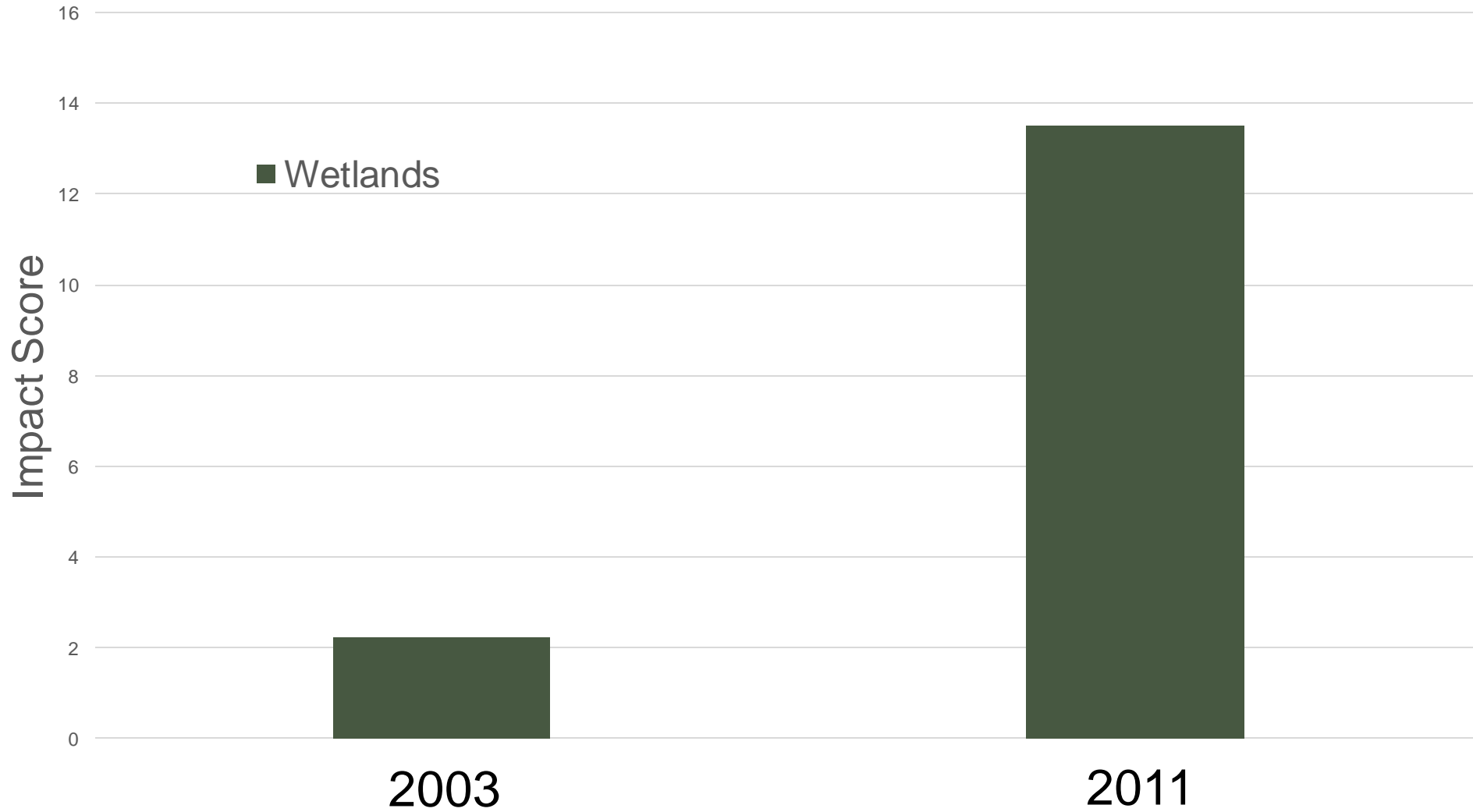


Hunting Impact Score





Management Impact Score





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Recommendations

Recommendations to the Steering Committee:

1. Flood impacts on Managed Wetland and Waterfowl Hunting

Flood Impacts: bird use, landowner/hunter access, infrastructure maintenance, wetland management for duck food

2. Impact equations for Managed Wetland and Waterfowl Hunting



For Reference



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