

Monitoring and Outcome Measures

- In Fisheries Division we collect data on numerous parameters related to population dynamics and health of fishes
 - These data support different objectives that are related to ecological outcomes
 - Outcomes are viewed using trend analyses given stated goals for outcomes
 - Fish population and aquatic habitat metrics are represented in all of these efforts



Monitoring and Outcome Measures



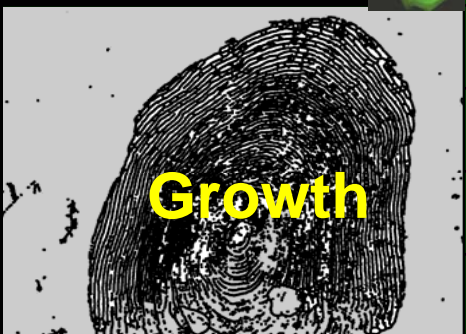
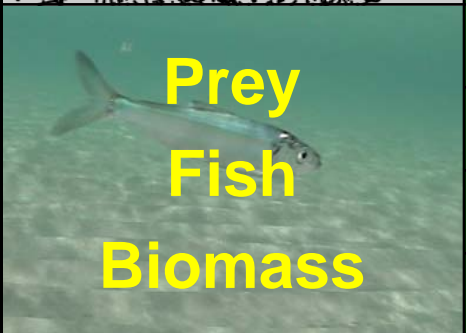

- U.S. Environmental Protection Agency Status of the Lake Ecosystem (SOLEC) indicators
- Criteria and Indicators for ecoregional planning efforts
- Triennial Report for status of the Environment for Michigan
- Management goals are referenced in specific lake and river management prescriptions



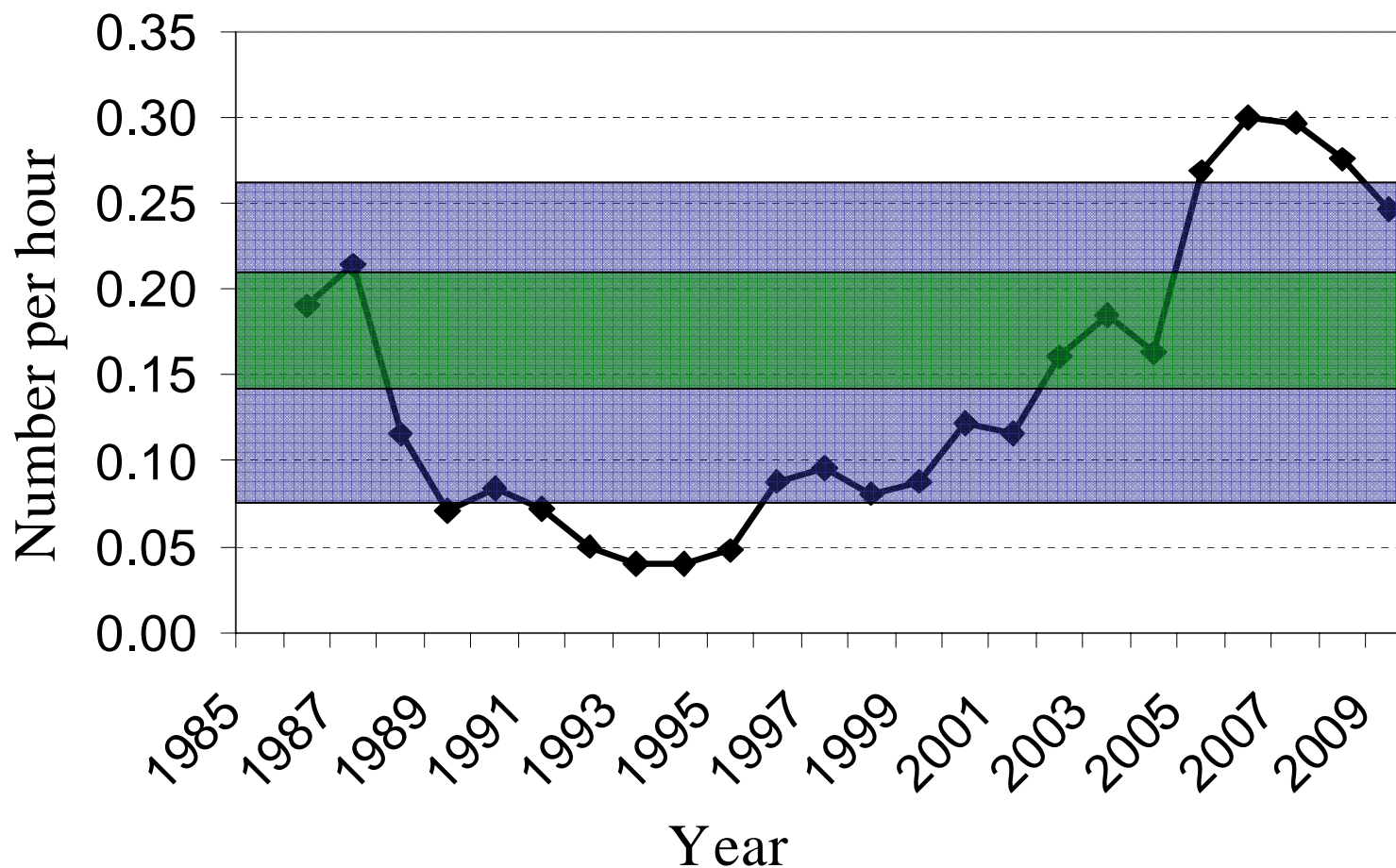
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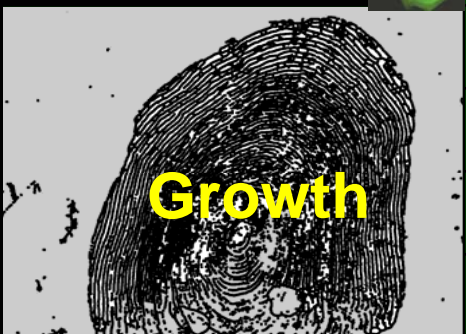
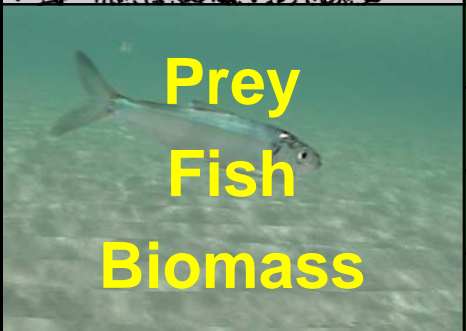

- Fish Community Objectives and Environmental Objectives for each Great Lake
- Status and Trends Program
- Red Flags indicators for health of salmon in lakes Michigan and Huron



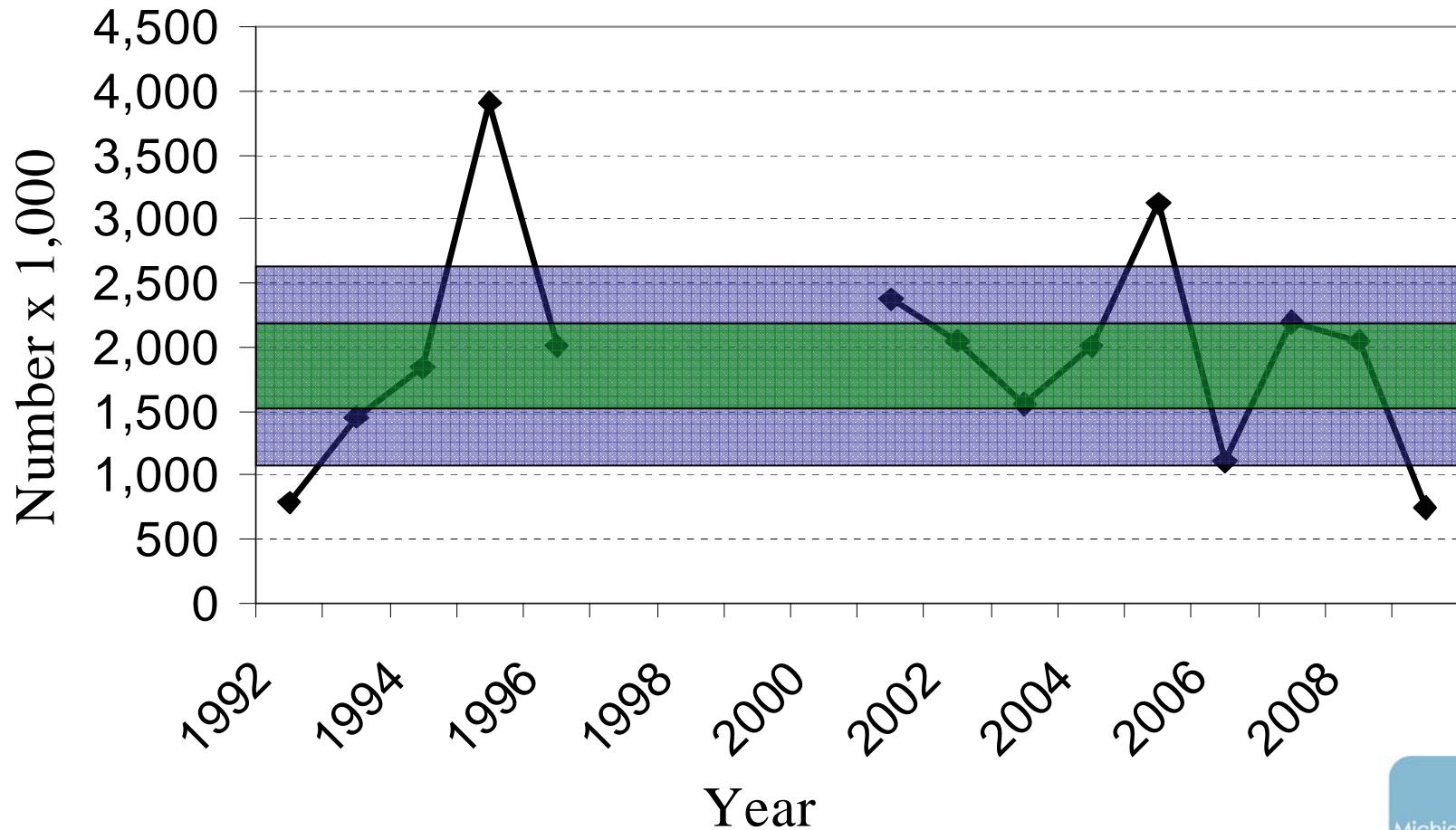
Variable	Index	Level I	Level II
 <p>Abundance</p>	Catch Rate (Charter)		
	Age-1 abundance		
	Weir Returns (Mi only)		
<p>Reproduction</p> 	OTC / Total		
 <p>Growth</p>	Creel wt at age 2		
	Creel wt at age 3		
	Weir wt at age 3		
	Standard wt		
 <p>Prey Fish Biomass</p>	Acoustic		
	Bottom trawl		
	Coho length index		
	Predator diet data		
 <p>Ecosystem Health</p>	Salmonine composition		
	Visual signs of disease		
	Muscle Plug Index		






Catch rates of Chinook salmon by charter anglers



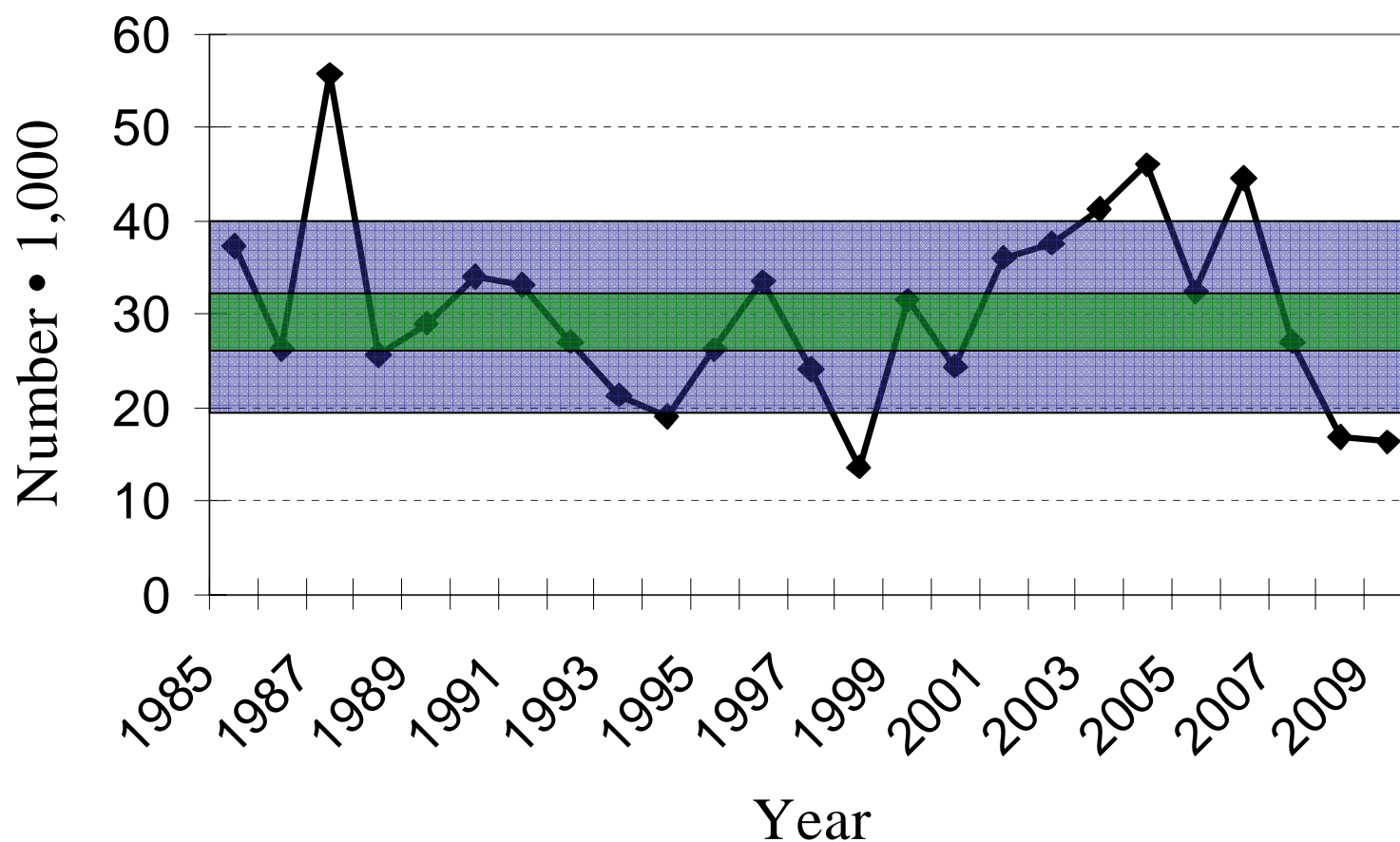
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



Abundance of Age-1 Chinook salmon








Variable	Index	Level I	Level II
 Abundance	Catch Rate (Charter)	No	Yes
	Age-1 abundance	Yes	Yes
	Weir Returns (Mi only)		
Reproduction 	OTC / Total		
 Growth	Creel wt at age 2		
	Creel wt at age 3		
	Weir wt at age 3		
	Standard wt		
 Prey Fish Biomass	Acoustic		
	Bottom trawl		
	Coho length index		
	Predator diet data		
 Ecosystem Health	Salmonine composition		
	Visual signs of disease		
	Muscle Plug Index		

Returns of Chinook salmon to harvest weirs in Michigan



Variable	Index	Level I	Level II
 Abundance	Catch Rate (Charter)	No	Yes
	Age-1 abundance	Yes	Yes
	Weir Returns (Mi only)	Yes	Yes
Reproduction 	OTC / Total		
 Growth	Creel wt at age 2		
	Creel wt at age 3		
	Weir wt at age 3		
	Standard wt		
 Prey Fish Biomass	Acoustic		
	Bottom trawl		
	Coho length index		
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 Ecosystem Health	Salmonine composition		
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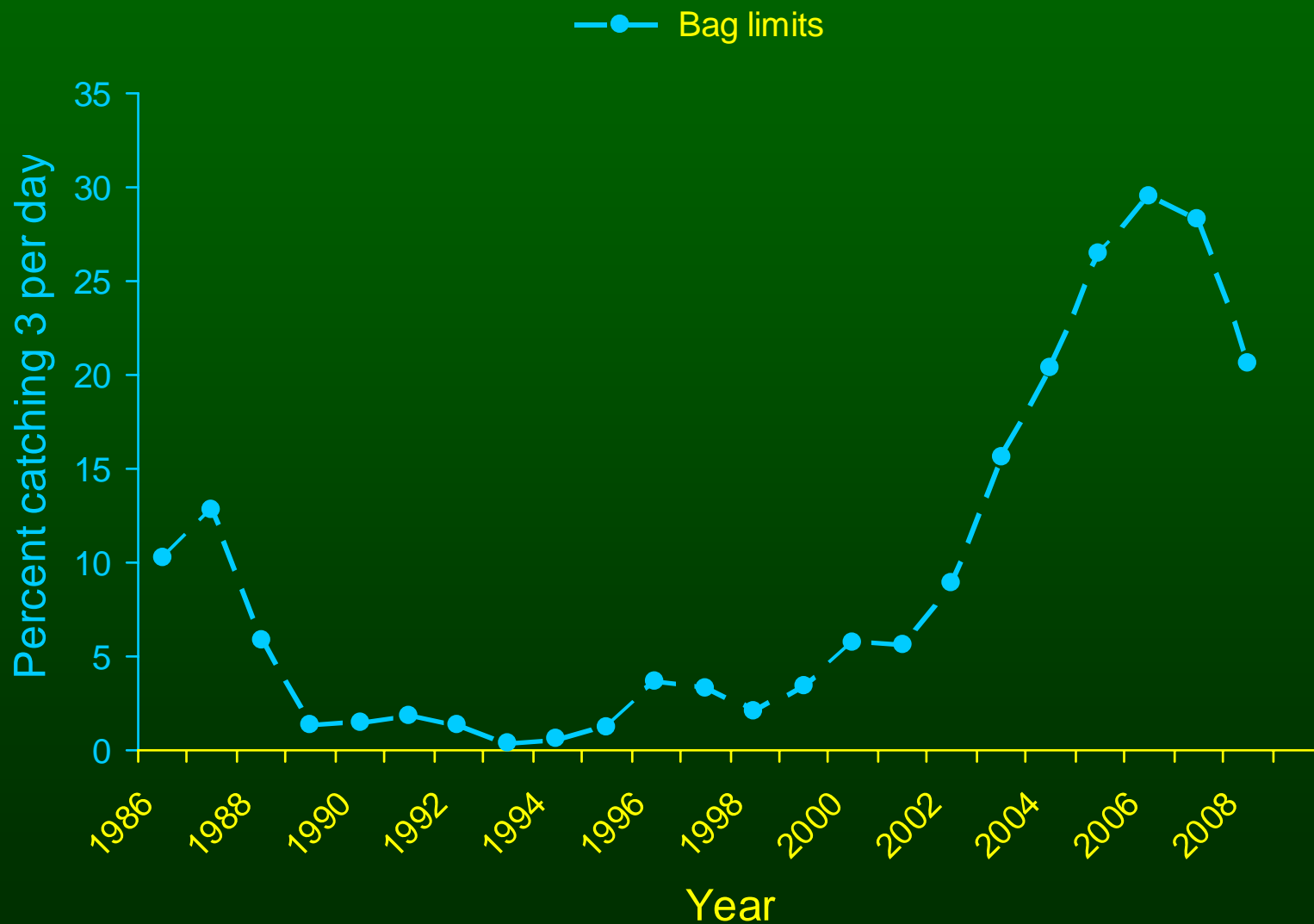
Variable	Index	Level I	Level II
 Abundance	Catch Rate (Charter)	No	Yes
	Age-1 abundance	Yes	Yes
	Weir Returns (Mi only)	Yes	Yes
Reproduction 	OTC / Total	No / Yes	Yes / Yes
 Growth	Creel wt at age 2	No	No
	Creel wt at age 3	Not used	Not used
	Weir wt at age 3	Yes	Yes
	Standard wt	No	Yes
 Prey Fish Biomass	Acoustic	No	Yes
	Bottom trawl	No	Yes
	Coho length index	No	Yes
	Predator diet data	NA	NA
 Ecosystem Health	Salmonine composition	NA	NA
	Visual signs of disease	No	No
	Muscle Plug Index	NA	NA

Salmon Bag Limits

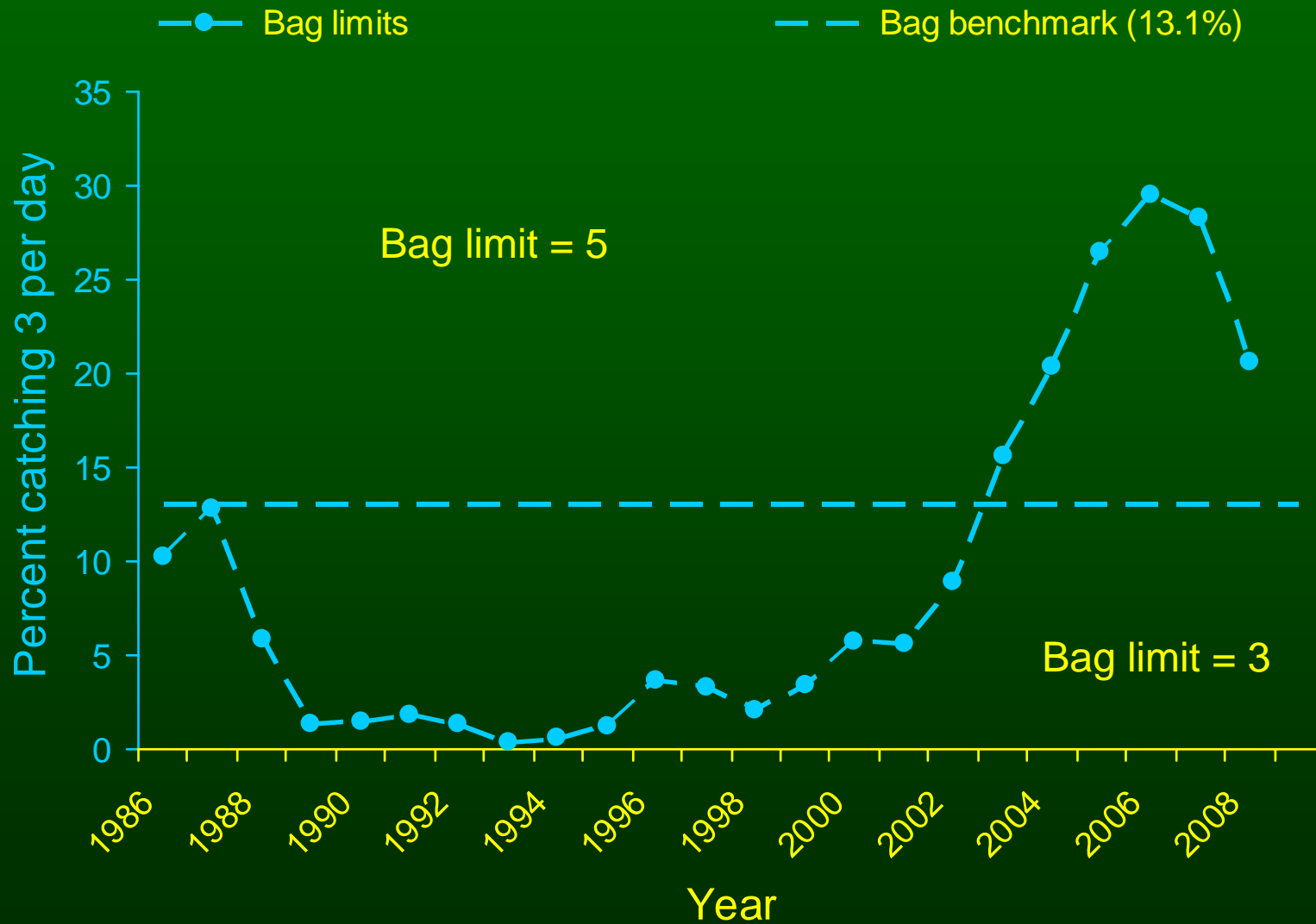
- Process to make change objectively
- Recommendation based on fishing reports from charter operators
- All creel survey data eventually used to ground truth decision



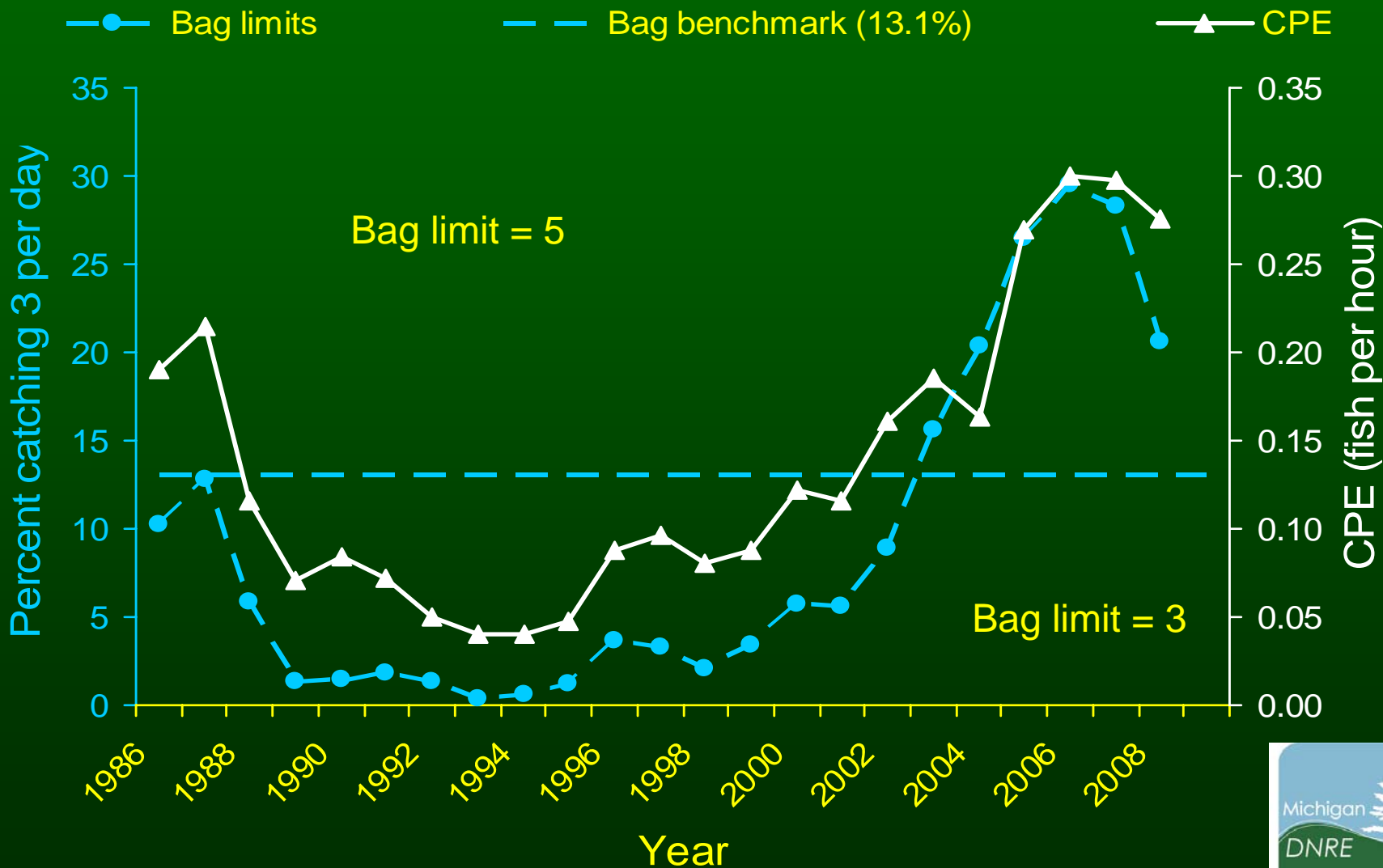
Percent of charter anglers catching 3 Chinook salmon per day



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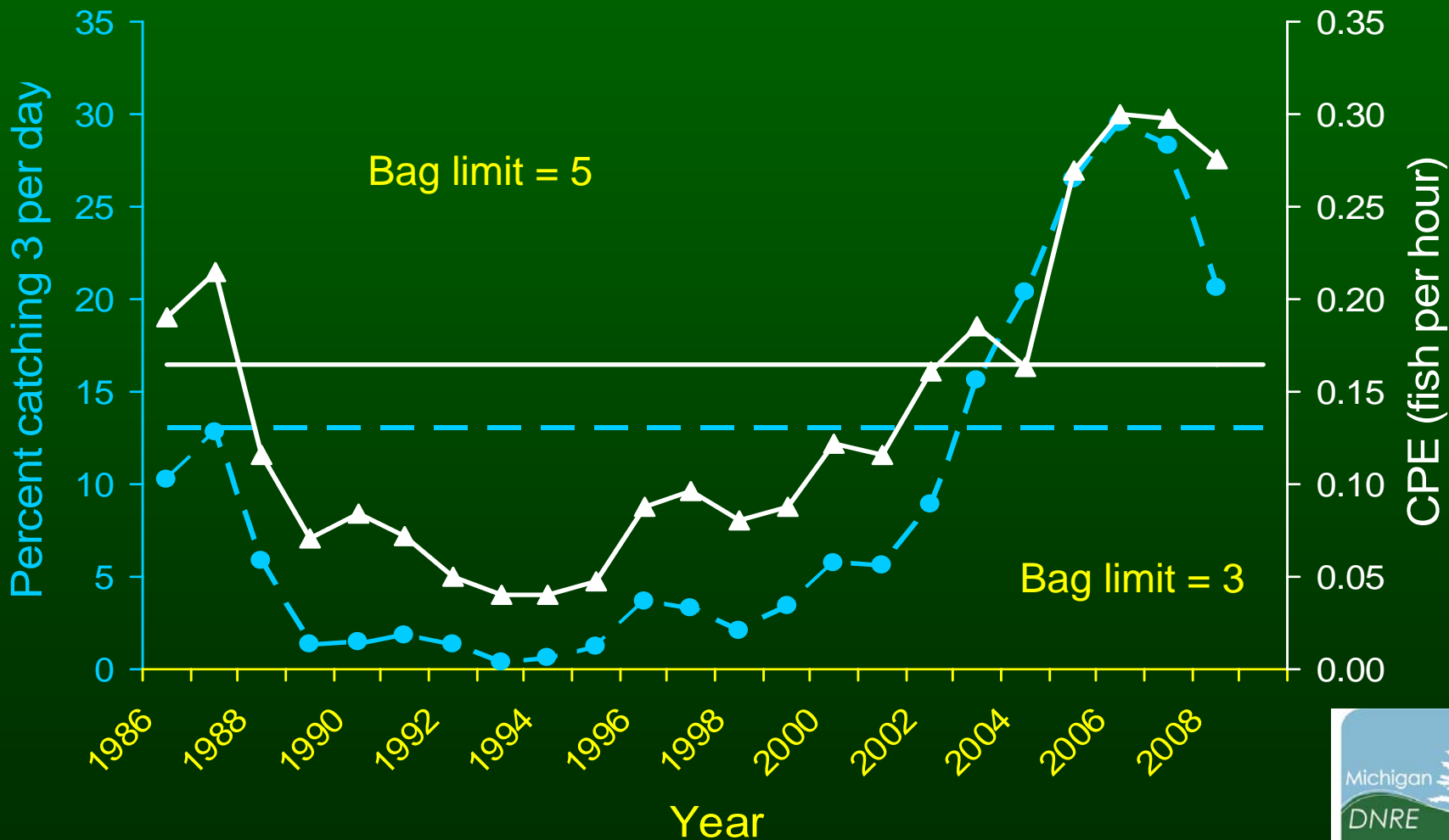


Percent of charter anglers catching 3 Chinook salmon per day and catch rate (fish/hour) of Chinook salmon



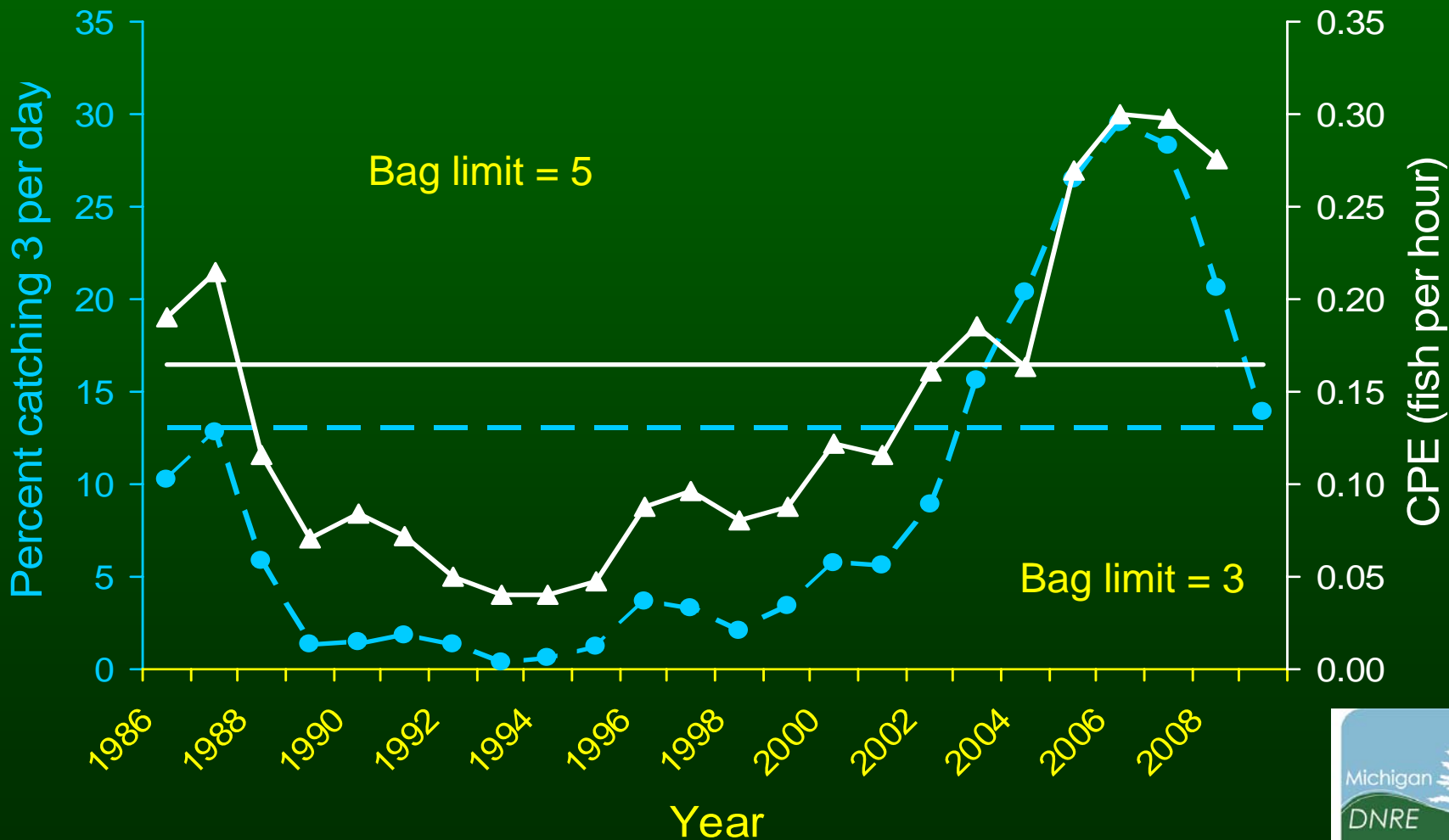
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● Bag limits - - - Bag benchmark (13.1%) ▲ CPE — CPE benchmark (0.165)



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