

Lecture 19
Nonindigenous Species
Fish Management (Zool 466)

1. Movement of fishes
 - a. Natural over typically long time scales
 - b. Humans increase the rate, frequency, and extent of movements
2. Intentional movement
 - a. Stockings in 1800s – common carp; US Fish Commission
 - b. Goldfish
 - c. Rainbow trout
3. Unintentional introductions – many sources
 - a. Bait buckets
 - b. Bilge
 - c. Canals
 - d. Escape from culture ponds
4. Terms (From Kolar and Lodge 2001. Trends in Ecology and Evolution 16:199-204)
 - a. Indigenous
 - b. Nonindigenous
 - c. Noninvasive
 - d. Invasive
 - e. Aquatic Nuisance Species
5. Impacts of nonindigenous and invasive fishes
 - a. Valuable – culture and sportfishing industry
 - b. Damage - \$1 billion annually
 - c. Homogenization of fish assemblages
6. Current status in US
 - a. 536 fish taxa are nonindigenous
 - i. 61% native
 - ii. 35% foreign
 - iii. 4% hybrids
 - b. Dominated by sportfish and forage
7. Sea lamprey
 - a. Chronology
 - i. 1819 Lake Ontario – Erie Canal
 - ii. 1921 Lake Erie - Welland Canal
 - iii. 1932 Lake Huron
 - iv. 1936 Lake Michigan
 - v. 1946 Lake Superior
 - b. Decimation of native fishes
 - c. Management response
 - i. Great Lake Fisheries Commission 1955
 - ii. Lampricides
 - iii. Mechanical and electric barriers
 - iv. Introduced Pacific salmon

- d. Current status
- 8. Asian carps
 - a. Common and grass
 - b. Three newcomers
 - i. Bighead
 - ii. Silver
 - iii. Black
 - c. Bighead
 - i. Arkansas 1972
 - ii. Appeared in Mississippi drainage by 1980s
 - d. Silver – much the same as bighead
 - e. Impact
 - i. Commercial
 - ii. Competition with natives
 - iii. Reduction of mussels (black)
 - iv. Great Lakes?
- 9. Solutions?
 - a. Stop transport
 - b. Understand and quantify risks of transport and stocking
 - c. Predicting invasives (difficult)
 - i. Omnivore?
 - ii. Fast reproducing?
 - iii. Migratory?
 - iv. Fast growing and large bodied?