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Table 4. Species characteristics of *Mysis relicta* compared with those of potential competitors and predators of *M. relicta* in established populations.

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SPECIES	HABITAT[a]	TROPHIC[b]	SIZE[c]
Oppossum shrimp *Mysis relicta*	semi-planktonic, benthic; diel vertical migration; very coldwater	omnivorous: zoo-, phyto- plankters, detritus; prey heavily on *Daphnia spp.*	average 14 - 22 mm at maturity; 30 mm maximum
Amphipod *Pallasea quadrispinosa*	benthic; part of population off-bottom at night; very coldwater	detritivorous	average 10 - 20 mm at maturity; 30 mm maximum
Amphipod *Pontoporeia affinis*	benthic, burrowing; limited diel vertical migration by adults; coldwater	detritivorous; indiscriminate feeding on orgainc matter in sediments	average 5 - 8 mm at maturity; 10 mm maximum
Alewife *Alosa pseudoharengus*	pelagic, schooling; shallow to moderate depths; coolwater in lakes	planktivorous; zooplankters, crustaceans, insects; fish larvae	average 120 - 180 mm at maturity; 280 mm maximum; rapid growth rate
Lake cisco *Coregonus artedii*	pelagic, schooling; shallow to moderate depths; cool to coldwater in lakes	planktivorous; zooplankters, crustaceans, chironomids	average 200 - 300 mm at maturity; 380 mm maximum; moderate growth rate
Bloater *Coregonus hoyi*	profundal, pelagic; moderate to great depths; coldwater in Great Lakes basin	predaceous; benthos, crustaceans, zooplankters	average 170 - 250 mm at maturity; 300 mm maximum; slow to moderate growth rate
Arctic char *Salvelinus alpinus*	pelagic, profundal; moderate depths; very coldwater primarily in lakes	planktivorous; zooplankters, benthos, insects; may be pisvorous as adults	average 380 - 450 mm at maturity; 640 mm maximum; slow to moderate growth rate
Lake trout *Salvelinus namaycush*	profundal; moderate to great depths; very coldwater primarily in lakes	predaceous; fish, crustaceans; piscivorous as adults	average 400 - 560 mm at maturity; 1200 mm maximum; slow growth rate
Rainbow smelt *Osmerus mordax*	pelagic, schooling; moderate depths; cool- to coldwater in lakes	predaceous, planktivorous; crustaceans, zooplankters; pottential piscivore	average 130 - 200 mm at maturity; 300 mm maximum; rapid growth rate
Burbot *Lota lota*	profundal; moderate to great depths; cool- to coldwater in lakes and rivers	predaceous nightfeeder; benthos, insects, crustaceans, molluscs, fish	average 280 - 480 mm at maturity; 890 mm maximum; rapid initial growth rate
Slimy sculpin *Cottus cognatus*	demersal; shallow to moderate depths; cool- to coldwater in lakes and streams	predaceous; benthos, insects, crustaceans; occassionally small fish	average 70 - 90 mm at maturity; 150 mm maximum; moderate growth rate
Deepwater sculpin *Myoxocephalus thompsoni*	demersal; great depths; very coldwater in lakes only	predaceous; benthos, crustaceans (*Mysis* and *Pontoporeia*), insects, copepods	average 60 - 80 mm at maturity; 130 mm maximum; moderate growth rate

[a] Habitat - distribution of the species within the available environment
[b] Trophic - feeding habits and food sources likely to be utilized
[c] Size - average total length at maturity and approximate maximum size

Table 5. Reproductive characteristics of *Mysis relicta* compared with those of potential competitors and predators of *M. relicta* in established populations.

	REPRODUCTION		
	TIMING[a]	LOCATION[b]	FECUNDITY[c]
Oppossum shrimp *Mysis relicta*	mates in fall; young released in spring	eggs laid in female brood pouch; young 3 - 4 mm in length when released	mature Age I - IV, depending on lake productivity; 10 - 35 eggs per female
Amphipod *Pallasea quadrispinosa*	probably mates in winter; young probably released in spring and summer	eggs laid in female brood pouch	probably mature Age I - III; birth rate higher than that of *Mysis*
Amphipod *Pontoporeia affinis*	mates in winter and spring; young released late spring to early summer	eggs laid in female brood pouch; young 0.3 mm in length when released	mature Age I - II; 15 - 40 eggs per female
Alewife *Alosa pseudoharengus*	spawn May to July at 15.5 C; eggs hatch in about 6 days	spawn in shallow water over sand to gravel substrate in lakes and streams	mature Age II - III; 10000 - 22000 eggs per female; demersal eggs
Lake cisco *Coregonus artedii*	spawn in fall, October to December at 4.5 C: eggs hatch in April	spawn in shallow water over a variety of substrates in lakes	mature Age II - III; 6000 - 20000 eggs per female; demersal eggs
Bloater *Coregonus hoyi*	spawn in March at 1.5 C; eggs hatch in June	spawn in deepwater over a variety of substrate in lakes	mature Age II - III; 4000 - 16000 eggs per female; demersal eggs
Arctic char *Salvelinus alpinus*	spawn November to December at 4 C; eggs hatch in April	spawn over rocky shoals in lakes or in quiet pools in rivers	mature Age IV - VI; 1900 - 3500 eggs per kg of female; demersal eggs
Lake trout *Salvelinus namaycush*	spawn in October at 11 C at night; eggs hatch in March	spawn in shallow water over boulder to rubble substrate in lakes	mature Age V - VII; 900 - 2600 eggs per kg of female; demersal eggs
Rainbow smelt *Osmerus mordax*	spawn March to May at 10 C at night; eggs hatch in 2 - 3 weeks	spawn in shallow water over gravel substrate in streams and lakes	mature Age II - III; 8000 - 30000 eggs per female; eggs adhere to substrate
Burbot *Lota lota*	spawn midwinter under ice at night, January to March at 1 C; eggs hatch May	spawn in shallow water in lakes and rivers over sand to gravel substrate	mature Age III - IV; 50000 - 1.5 million eggs per female; semipelagic eggs
Slimy sculpin *Cottus cognatus*	spawn May to June at 5 - 10 C; eggs hatch June to July	spawn in shallow water under rocks in streams or lakes; male gaurds eggs	mature Age II - III; 200 - 1400 eggs per female; adhesive eggs form clump
Deepwater sculpin *Myoxocephalus thompsoni*	spawn November to May at 1 C; eggs hatch February to July	spawn in deepwater in lakes only; male guards eggs	mature Age II - III; 200 - 1200 eggs per female; adhesive eggs for clump

[a] Timing - approximate spawning time and temperature and approximate time of hatching
[b] Location - habitat types suitable for reproduction
[c] Fecundity - age at maturity and approximate egg number per female

Table 6. Introduction information for *Mysis relicta* compared with that of potential competitors and predators of *M. relicta* in established populations.

	INTRODUCTION		
	HISTORY[a]	ACQUISITION[b]	VAGILITY[c]
Oppossum shrimp *Mysis relicta*	introduced and established in lakes in Canada, United States, and Europe	simple; daytime off-bottom or nighttime pelagic trawling; transport easily	moderate; have passively spread via canals, rivers, and pumps in Colorado
Amphipod *Pallasea quadrispinosa*	introduced and established in many lakes in Sweden	obtain from Europe; daytime off-bottom trawling; transport easily	probably low; close association with substrate should limit spread
Amphipod *Pontoporeia affinis*	no known attempts; have been reared and will reproduce under lab conditions	simple; daytime off-bottom trawling; transport easily	probably low; close association with substrate should limit spread
Alewife *Alosa pseudoharengus*	widely introduced and established in northeastern United States as forage	probably simple; eggs or fry; adults transport poorly	very high; will readily travel through lakes and rivers invaded Great Lakes
Lake cisco *Coregonus artedii*	introduced and established in Canada; proposed in Ft. Peck Reservoir, Montana	probably simple; eggs or adults	probably low; may move to downstream lakes
Bloater *Coregonus hoyi*	no known attempts; eggs hatched and young reared in lab	probably difficult; endemic to Great Lakes; eggs probably only alternative	probably low; preference for deep, coldwater would probably limit movement
Arctic char *Salvelinus alpinus*	introduced and established in many Scandinavian lakes	simple; eyed eggs	probably moderate; will inhabit rivers and may move to other lakes
Lake trout *Salvelinus namaycush*	introduced and established in many in the United States	simple; eyed eggs or fingerlings	low; enters rivers to feed; preference for deep, coldwater limits movement
Rainbow smelt *Osmerus mordax*	widely introduced and established in United States primarily as forage	probably simple; adults or possibly eggs	very high; will readily travel through lakes and rivers
Burbot *Lota lota*	no known attempts	probably simple; adults or possibly eggs	probably moderate; will inhabit rivers and may move to other lakes
Slimy sculpin *Cottus cognatus*	no known attempts	probably difficult; adults probably only option due to parental care of eggs	probably moderate; will inhabit streams and may move to other lakes
Deepwater sculpin *Myoxocephalus thompsoni*	no known attempts	probably difficult; adults probably only option due to parental care of eggs	probably low; preference for deep coldwater would probably limit movement

[a] History - previous experience with introduction attempts
[b] Aquisition - relative availability and/or method or source of introduction
[c] Vagility - relative capability for dispersion or colinization (self-introduction)

Table 7. Population considerations for *Mysis relicta* compared with those of potential competitors and predators of *M. relicta* in established populations.

	POPULATION		
	POTENTIAL[a]	STABILITY[b]	CONTROLLABILITY[c]
Oppossum shrimp *Mysis relicta*	high; little utilization by fish in many established populations	populations may display considerable fluctations; no documented die-offs	currently low; few to no sympatric fish species among established populations
Amphipod *Pallasea quadrispinosa*	probably moderate; low abundance in benthic studies	probably stable; introduced populations develop relatively slowly	probably good; very susceptible to fish predation
Amphipod *Pontoporeia affinis*	very high; often the most abundant organism in many benthic studies	probably stable; no documented population fluctuations or die-offs	probably low; able to burrow; tolerates low D.O. which would preclude fish
Alewife *Alosa pseudoharengus*	very high; frequently dominate ecosystems when established becoming nuisance	poor stability; annual spring and summer die-offs documented	probably low; fish predation probably only means of control
Lake cisco *Coregonus artedii*	possibly high; historically attained great numbers in its native range	probably stable; no documented die-offs	probably low; most control through fish predation and possibly angling
Bloater *Coregonus hoyi*	probably moderate	probably stable; no documented die-offs	probably low; fish predation probably only means of control
Arctic char *Salvelinus alpinus*	moderate; possible slower growth rates and older age at maturity	stable; populations would probably require supplemental stocking	good; angling and stocking would control most populations
Lake trout *Salvelinus namaycush*	low; slow growth and older ages at maturity limit abundance	stable; many populations subject to supplemental stocking	good; control by angling, stocking, and reservoir drawdown after spawning
Rainbow smelt *Osmerus mordax*	very high; many introduced populations have attained great numbers	moderate stability; documented die-offs	probably moderate; most control through fish predation and some through angling
Burbot *Lota lota*	probably moderate; reportedly attained large numbers in some lakes	probably stable; no documented die-offs	probably low; control by angling and possibly netting during spawning
Slimy sculpin *Cottus cognatus*	possibly high	probably stable; no documented die-offs	probably low; fish predation probably only means of control
Deepwater sculpin *Myoxocephalus thompsoni*	possibly high	probably stable; no documented die-offs; extirpated in Lake Ontario	probably low; fish predation probably only means of control

[a] Potential - relative abundance the species may achieve in new environment
[b] Stability - relative variation in population numbers over time
[c] Controllability - capability to influence population levels upon establishment

Table 8. Fishery considerations for *Mysis relicta* compared with those of potential competitors and predators of *M. relicta* in established populations.

	POTENTIAL		
	FISHERY[a]	FORAGE[b]	DISEASE[c]
Oppossum shrimp *Mysis relicta*	none	excellent; limited at present due to unavailability to many fish species	none known that are transmissible to fish
Amphipod *Pallasea quadrispinosa*	none	excellent; effects on fish appear more positive than *Mysis* in Swedish lakes	unknown
Amphipod *Pontoporeia affinis*	none	excellent; primarily for benthic feeding fish species	possible intermediate host for *Echinorcynchus salmonis* and *Cyathocephalus*
Alewife *Alosa pseudoharengus*	none	excellent; all sizes of warm- to coldwater deepwater and pelagic predators	numerous known parasites; transfer of treated eggs should eliminate diseases
Lake cisco *Coregonus artedii*	limited; may contribute to ice fishery; excellent eating quality	excellent; deepwater and pelagic predators; may exceed vulnerable size	numerous known parasites; transfer of treated eggs should eliminate diseases
Bloater *Coregonus hoyi*	very limited; probably unavailable to anglers during most of year	excellent; all sizes of lake trout and other deepwater predatory fish species	numerous known parasites; transfer of treated eggs should eliminate diseases
Arctic char *Salvelinus alpinus*	excellent; very popular in Canada and Europe; probably moderate bag limits	minor	numerous known parasites; transfer of treated eggs should eliminate diseases
Lake trout *Salvelinus namaycush*	moderate; low bag limit; size restrictions; excellent trophy potential	minor	numerous known parasites; transfer of treated eggs should eliminate diseases
Rainbow smelt *Osmerus mordax*	moderate; may contribute to ice fishery; "smelting" during spring spawning	excellent; all sizes of warm- to coldwater deepwater and pelagic predators	numerous known parasites; careful selection of source to avoid diseases
Burbot *Lota lota*	limited; may contribute to ice fishery; debatable eating quality	minor	numerous known parasites; careful selection of source to avoid diseases
Slimy sculpin *Cottus cognatus*	none	excellent; small size vulnerable to all sizes of predaceous fish	numerous known parasites; careful selection of source to avoid diseases
Deepwater sculpin *Myoxocephalus thompsoni*	none	excellent; all sizes of lake trout and other deepwater predatory fish species	limited information; careful selection of source to avoid diseases

[a] Fishery - relative capacity of species to provide sport harvest
[b] Forage - relative suitability of species as fish forage
[c] Disease - major pathogens and/or parasites that could accompany species introductions