Designing Fish-Friendly Culverts (and bridges)

WHAT MAKES MIGRATION TOUGH FOR FISH?

	Years ago, rivers were straightened so logs could get to mills. This degraded fish habitat.
	Abandoned dams used during the log drive days continue to block fish migration.
	Dams may delay or totally prevent migration and altered flow may favor non-migratory and/or non-native fish.
	Historic mill dams can affect the natural flow of rivers and prevent fish from migrating. Abandoned dams are also unsafe. **Choose 2**.
	Traditional round culverts tend to hinder or totally block fish movement. Undersized culverts also disrupt natural flow and sediment transfer. **Choose 4**.
	Fish trapped below culverts can be easy prey for birds.
	Intake pipes can suck juvenile fish into the industrial plant's cooling process.
	Wastewater discharge may degrade water quality.
	Air pollution from factories and sewage treatment plants can degrade water quality.
	Runoff from fertilizers can degrade water quality.
	Irrigation can reduce water levels; remaining water can then become too warm for native fishes.
	Grazing cattle can damage river banks and degrade water quality.
	Migratory fish may be legally harvested in other countries; here they are sold in a fish market.
	Migratory fish may be an unintended bycatch in fisheries targeting other species.
	Some migratory fish are intercepted at sea en route to and from spawning habitat.
	Warming of rivers and oceans can impact fish survival.
	A changing climate can alter oceanic currents vital to migratory fish.
	Mammals such as the east coast harbor seal or west coast elephant seal may prey on migratory fish. **Choose 2**.
	Predatory fish intercept migrating fish in coastal waters.
	Non-native fish prey on juvenile migratory fish and disrupt the food chain.
	Many species of birds eat migratory fish. These include bald eagles, ospreys, and brown pelicans. **Choose 4**.

CONSERVING AMERICA'S fisheries
U.S. Fish & Wildlife Service
Johnny Morris WONDERS OF WILDLIFE NATIONAL MUSEUM & AQUARIUM

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14	Years ago, rivers were straightened so logs could get to mills. This degraded fish habitat.
27	Abandoned dams used during the log drive days continue to block fish migration.
7	Dams may delay or totally prevent migration and altered flow may favor non-migratory and/or non-native fish.
4, 13	Historic mill dams can affect the natural flow of rivers and prevent fish from migrating. Abandoned dams are also unsafe. **Choose 2**.
5, 10, 12, 28	Traditional round culverts tend to hinder or totally block fish movement. Undersized culverts also disrupt natural flow and sediment transfer. **Choose 4**.
11	Fish trapped below culverts can be easy prey for birds.
26	Intake pipes can suck juvenile fish into the industrial plant's cooling process.
9	Wastewater discharge may degrade water quality.
19	Air pollution from factories and sewage treatment plants can degrade water quality.
2	Runoff from fertilizers can degrade water quality.
3	Irrigation can reduce water levels; remaining water can then become too warm for native fishes.
1	Grazing cattle can damage river banks and degrade water quality.
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23, 24	Mammals such as the east coast harbor seal or west coast elephant seal may prey on migratory fish. **Choose 2**.
8	Predatory fish intercept migrating fish in coastal waters.
6	Non-native fish prey on juvenile migratory fish and disrupt the food chain.
16, 18, 21, 25	Many species of birds eat migratory fish. These include bald eagles, ospreys, and brown pelicans. **Choose 4**.

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