

5.11 Invasive Plants and Animals

5.11.1 Introduction

Changes in reservoir operations have the potential to affect habitat suitability for invasive terrestrial and aquatic animals and terrestrial plants. Changes in habitat suitability would affect species abundance or their ability to colonize new areas.

5.11.2 Impact Assessment Methods

To determine impacts on invasive species, each policy alternative was evaluated to determine whether revised operation of the water control system would produce consistent support for conditions critical to the life history of the identified species. When changes in operations would consistently produce more favorable conditions, an increase in the abundance of invasive species was assumed. Factors considered in the analysis included:

- Increased development of open spaces;
- Changes to water quality;
- Increased reservoir elevations over longer duration; and,
- Changes to reservoir and tailwater flows.

Proposed changes to the reservoir operations policy under each alternative were evaluated for these four factors to determine how the alternatives would affect the population abundance and spread of invasive terrestrial and aquatic plants and animals.

5.11.3 Base Case

Invasive Terrestrial Animals and Plants

Under the Base Case, suitable habitat for invasive terrestrial animals and their populations is expected to continue to increase due to reasonably foreseeable actions in the Valley. Similarly, invasive terrestrial plant populations are expected to continue to increase as native habitats are altered to accommodate population growth and subsequent development pressures. This alternative is therefore not expected to directly affect the present or future rate of the establishment or spread of invasive terrestrial animals or plants.

Invasive Aquatic Animals

The Base Case would not affect habitat suitability for common carp, grass carp, or rusty crayfish; because these species tolerate a wide range of environmental conditions, their populations are expected to continue to increase. The feeding habits of the three species adversely affect the habitats and populations of other more desirable fish species. Alewives and blueback herring, on the other hand, prefer cool, well-oxygenated water, which may become limited in certain reservoirs during late summer under the Base Case. Asiatic clam

5.11 Invasive Plants and Animals

densities fluctuate from year to year but would likely remain high, and zebra mussel populations would likely continue to increase and expand.

5.11.4 Reservoir Recreation Alternative A, Reservoir Recreation Alternative B, Equalized Summer/Winter Flood Risk Alternative, and Tailwater Recreation Alternative

Invasive Terrestrial Animals and Plants

Under Reservoir Recreation Alternative A, Reservoir Recreation Alternative B, the Equalized Summer/Winter Flood Risk Alternative, and the Tailwater Recreation Alternative, summer pool elevations would be extended and winter pool elevations would be altered, depending on the climate. These alternatives are not expected to modify habitat suitability for most invasive terrestrial animals or most invasive terrestrial plants. Their present rate of establishment or spread is not expected to be affected by extending the summer reservoir elevations and decreasing the length of time that the flats are exposed, because these species do not depend on the flats. Changes in winter elevations are not anticipated to influence invasive plants or animals beyond expectations for the Base Case.

Invasive Aquatic Animals

Habitat suitability for common carp, grass carp, and rusty crayfish would be unaffected by all policy alternatives. Because these species tolerate a wide range of environmental conditions, their populations are expected to continue to increase. Alewives and blueback herring prefer cool, well-oxygenated water, which may restrict their expansion downstream regardless of the selected alternative. As under the Base Case, densities of Asiatic clam would likely remain high, and zebra mussel populations would likely continue to increase and expand regardless of the selected alternative.

5.11.5 Summer Hydropower Alternative

Invasive Terrestrial Animals and Plants

Under the Summer Hydropower Alternative, drawdown would begin in June to increase power production. This modification would change the length of time that the flats are exposed and the extent of their exposure. Exposure of the flats for longer periods of time could result in the establishment of invasive plant species such as common privet and Japanese knotweed, increasing their distribution. Invasive terrestrial animals do not rely on flats or summer water levels; therefore, this alternative is not expected to affect their rate of establishment or spread. Raising water levels would cause invasive terrestrial plants that presently inhabit the shoreline to move inland; therefore, their population levels would be maintained.

Invasive Aquatic Animals

Habitat suitability for alewives, blueback herring, common carp, grass carp, rusty crayfish, Asiatic clams, and zebra mussels would be unaffected by all policy alternatives (see Section 5.11.4).

5.11.6 Commercial Navigation Alternative

Invasive Terrestrial Animals and Plants

Under the Commercial Navigation Alternative, winter reservoir elevations would be raised in the mainstem reservoirs. Increased winter reservoir elevations could reduce the spread of some invasive terrestrial plant species along mainstem reservoirs and cause other species (such as Japanese knotweed and common privet) to move inland as water levels are extended, which would maintain present population levels of these species.

Invasive Aquatic Animals

Habitat suitability for alewives, blueback herring, common carp, grass carp, rusty crayfish, Asiatic clams, and zebra mussels would be unaffected by all policy alternatives (see Section 5.11.4).

5.11.7 Tailwater Habitat Alternative

Invasive Terrestrial Animals and Plants

The Tailwater Habitat Alternative involves fill dates and drawdown levels that differ from present operations for some reservoirs, depending on annual precipitation patterns. Reservoir levels generally would be higher than those under the Base Case. The spread of some invasive terrestrial plant species could be reduced but, if winter levels exceed maximum summer elevations (Great Falls), suitable habitat may be created for the inland expansion of common privet and Japanese knotweed—as well as other invasive plants.

Invasive Aquatic Animals

Habitat suitability for alewives, blueback herring, common carp, grass carp, rusty crayfish, Asiatic clams, and zebra mussels would be unaffected by all policy alternatives (see Section 5.11.4).

5.11.8 Preferred Alternative

Invasive Terrestrial Animals and Plants

Under the Preferred Alternative, summer pool elevations would be extended and winter pool elevations would be altered. These changes are not anticipated to affect the current rate of

5.11 Invasive Plants and Animals

most invasive terrestrial plant, terrestrial animal, or aquatic animal establishment or spread. As described in Reservoir Recreation A Alternative, a slight reduction in the spread of some invasive terrestrial plant species could result due to increased winter reservoir elevations. Invasive terrestrial animal species are expected to respond to this alternative as under the Base Case.

Invasive Aquatic Animals

Habitat suitability for alewives, blueback herring, common carp, grass carp, rusty crayfish, Asiatic clams, and zebra mussels would be unaffected by all policy alternatives (see Section 5.11.4).

5.11.9 Summary of Impacts

Table 5.11-01 provides a summary of impacts on invasive terrestrial and aquatic animals and terrestrial plants by policy alternative.

Habitat suitability for most invasive terrestrial animals would be unaffected by all policy alternatives because the species tolerate a wide range of environmental conditions. Their present trends relative to rate of establishment or spread would override the effects of any of the alternatives. Similarly, population abundance and spread of invasive terrestrial plants would be unaffected by any of the alternatives, except for the Summer Hydropower Alternative, where exposure of the flats for longer periods of time could result in the establishment of certain invasive plant species, thus increasing their distribution.

Habitat suitability for alewives, blueback herring, common carp, grass carp, and rusty crayfish would be unaffected by all policy alternatives. Because these species tolerate a wide range of environmental conditions, their populations are expected to continue to increase. Alewives prefer cool, well-oxygenated water, which may restrict their expansion downstream regardless of the alternative selected. Asiatic clam densities likely would remain high, and zebra mussel populations likely would continue to increase and expand regardless of the alternative selected.

Of all alternatives evaluated, only the Summer Hydropower Alternative is expected to increase the abundance of invasive terrestrial plants or animals or invasive aquatic animals (Table 5.11-01). However, because natural variability would likely result in potential impacts as great, or greater than, the impacts associated with this alternative, a measurable increase in impacts would not be expected.

Table 5.11-01 Summary of Impacts on Invasive Terrestrial and Aquatic Animals and Terrestrial Plants by Policy Alternative

Alternative	Description of Impacts
Base Case	No change – Habitat suitability and populations of terrestrial animals and plants would continue to increase. Populations of common carp, grass carp, rusty crayfish, and zebra mussel would continue to increase. Asiatic clam densities would remain high. Alewife populations would remain the same. Blueback herring would continue downstream habitation of cool-water environments below Hiwassee Reservoir.
Reservoir Recreation A	No change – Habitat suitability of terrestrial animals and plants, and their present rate of establishment or spread would not change due to extending summer reservoir elevations. Impacts on aquatic animals would be the same as those for the Base Case.
Reservoir Recreation B	No change – Impacts would be the same as those for the Base Case.
Summer Hydropower	Slightly adverse – Distributions of some invasive plant species would increase; distributions of terrestrial animals would not change. Impacts on aquatic animals would be the same as those for the Base Case.
Equalized Summer/ Winter Flood Risk	No change – Impacts would be the same as those for the Base Case.
Commercial Navigation	No change – Impacts would be the same as those for the Base Case.
Tailwater Recreation	No change – Impacts would be the same as those for the Base Case.
Tailwater Habitat	No change – Impacts would be the same as those for the Base Case.
Preferred	No change – Impacts would be the same as those for the Base Case.

This page intentionally left blank.