

Bleak (*Alburnus alburnus*)

Ecological Risk Screening Summary

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1 Native Range, and Status in the United States

Native Range

From Kottelat (1997):

“Europe and Asia: most of Europe north of Caucasus, Pyrénées and Alps, eastward to Ural and Emba. Naturally absent from Iberian Peninsula, Adriatic and Aegean basins (except Maritza drainage), Italy, Ireland, Great Britain (except southeast), Norway and Scandinavia north of 67°N, Caspian basin south of Volga.”

Status in the United States

This species has not been reported in the United States.

Means of Introductions to the United States

This species has not been reported in the United States.

Remarks

N/A

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2012):

“Kingdom Animalia
Phylum Chordata
Subphylum Vertebrata
Superclass Osteichthyes
Class Actinopterygii
Subclass Neopterygii
Infraclass Teleostei
Superorder Ostariophysi
Order Cypriniformes
Superfamily Cyprinoidea
Family Cyprinidae
Genus *Alburnus*
Species *Alburnus alburnus* (Linnaeus, 1758)

Taxonomic Status: Valid.”

Size, Weight, Age

From Kottelat (1997):

“Maturity: Lm 9.9, range 9 - ? cm; Max length : 25.0 cm TL male/unsexed; (Billard 1997); common length : 15.0 cm TL male/unsexed; (Billard 1997); max. published weight: 60.0 g (Billard 1997).”

Environment

From Kottelat (1997):

“Freshwater; brackish; benthopelagic; pH range: 7.0 - ? ; dH range: 10 - ?; potamodromous (Riede 2004); depth range 1 - ? m (Billard 1997).”

Climate/Range

From Kottelat (1997):

“Temperate; 10°C - 20°C (Baensch and Riehl 1991); 68°N - 35°N, 6°W - 60°E.”

Distribution Outside the United States

Native

From Kottelat (1997):

“Europe and Asia: most of Europe north of Caucasus, Pyrénées and Alps, eastward to Ural and Emba. Naturally absent from Iberian Peninsula, Adriatic and Aegean basins (except Maritza drainage), Italy, Ireland, Great Britain (except southeast), Norway and Scandinavia north of 67°N, Caspian basin south of Volga.”

Introduced

From Kottelat (1997):

“In Anatolia, Marmara basin. Locally introduced in Spain, Portugal and Italy. At least one country reports adverse ecological impact after introduction.”

Introduced from the U.K. to Cyprus. Population established (Welcomme 1988).

Introduced from unknown location to Cap Djinet dam, Africa. Population established but isolated or rare (Kara 2011).

Means of Introduction Outside the United States

From Vinyoles et al. (2007):

“New introductions seem to be the result of deliberate actions by anglers that use the bleak either as prey for piscivorous species or as live bait which is frequently released to the water after angling sessions.”

“In the Iberian rivers of Mediterranean type water regulation, dam construction and excessive water extraction have contributed to a progressive substitution of rheophilic habitats by more lentic ones, and alterations have occurred simultaneously with bleak expansion (Copp, 1990; Elvira et al., 1998). In this study a relationship between expansion of the bleak and the construction of dams has been found. Thus, our findings suggest that the species dispersal is more significant in regulated rivers. In non-regulated rivers upstream of dams, the majority of the bleak were located in close proximity to dams (or just in the reservoirs), suggesting that they play an important role in bleak expansion. In its original distribution area the bleak occupies habitats with slow water (Brabrand, 1983). The attenuation of natural flow fluctuations in water bodies caused by dams has already been associated with the presence of other introduced species (Bernardo et al., 2003; Clavero et al., 2004).”

From CABI (2014):

“The bleak is without interest to the aquarium trade, but is widely used as bait in recreational fishing of game-fish (i.e. mainly predator fish). It is also used as a food supply (i.e. forage species) for stocks of introduced predators (e.g. black bass (*Micropterus* spp.)). The main pathway of fish introductions is through recreational fishing in many developed countries;

therefore, angling is the main activity responsible for the presence of bleak in watersheds. Due to its high mobility, interconnections between watersheds also present a risk of further spread.”

From Kottelat (1997):

Introduced to Cyprus accidentally (Welcomme 1988).

Short description

From Kottelat (1997):

“Dorsal spines (total): 2 - 4; Dorsal soft rays (total): 7-9; Anal spines: 3; Anal soft rays: 14 - 20; Vertebrae: 41 - 44. Diagnosed from congeners in Europe by the possession of the following characters: origin of anal fin below branched dorsal rays 4-5; lateral line with 45-48 + 3 scales; anal fin with 17-20½ branched rays; 16-22 gill rakers; ventral keel exposed from anus to pelvic base; lateral stripe absent in life, faint or absent in preserved specimens; and mouth slightly superior (Kottelat and Freyhof 2007). Caudal fin with 19 rays (Spillman 1961 and Keith and Allardi 2001).”

From CABI (2014):

“Species within the genus *Alburnus* are quite similar, and the help of a taxonomist is required for proper identification.”

Biology

From Kottelat (1997):

“Inhabits open waters of lakes and medium to large rivers. Forms large aggregations in backwaters and other still waters during winter. Adults occur in shoals near the surface. Larvae live in littoral zone of rivers and lakes while juveniles leave shores and occupy a pelagic habitat, feeding on plankton, drifting insects or invertebrates fallen on the water surface (Kottelat and Freyhof 2007). Feeds mainly on plankton, including crustaceans (Billard 1997) and insects (Vostradovsky 1973). Spawns in shallow riffles or along stony shores of lakes, occasionally above submerged vegetation (Kottelat and Freyhof 2007).”

Human uses

From Kottelat (1997):

“Fisheries: minor commercial; aquaculture: commercial; bait: usually.”

“Excellent as bait for carnivorous fishes. May be captured using the smallest hook and a fly as bait. Its flesh is tasty (Billard 1997). Of little interest to commercial or sport fisheries in its native range because of its small size (Welcomme 1988). Scales were previously utilized in making Essence d"Orient, a coating for artificial pearls (Kottelat and Freyhof 2007).”

From CABI (2014):

“The bleak is without interest to the aquarium trade, but is widely used as bait in recreational fishing of game-fish (i.e. mainly predator fish). It is also used as a food supply (i.e. forage species) for stocks of introduced predators (e.g. black bass (*Micropterus* spp.).”

Diseases

None reported.

Threat to humans

None reported.

3 Impacts of Introductions

From Vinyoles et al. (2007):

“In Cyprus, its high fecundity allowed the bleak to outcompete other species (Welcomme, 1988. Welcomme stated “Stunted populations: May serve as a useful forage fish but large numbers create nuisance.”). According to J. Carbonero (pers. comm., 2006) the same situation exists in Iberian rivers. Other factors that may contribute to the adaptability of the bleak include its ability to exploit a widespread spectrum of prey (Vollestad, 1985; Chappaz *et al.*, 1987; Biro & Musko, 1995; Vasek & Kubecka, 2004; Mehner *et al.*, 2005) and its temperature tolerance (from mountain lakes to the River Ebro with summer temperatures around 30°C).”

From Horppila et al. (1992):

“Enclosure experiments in the field showed the impacts of planktivorous bleak on water quality; in an enclosure with a density of 1 fish m⁻² average daily algal production (1370 mg C m⁻²) and chlorophyll-*a* concentration (50-90 µg l⁻¹) were more than twice that in an enclosure without fish. The field studies suggested that a bleak population can increase algal productivity and biomass.”

From CABI (2014):

“Introduced *A. alburnus* does not represent a risk for humans but it may cause changes in ecosystems (i.e. altering food web structures and nutrient cycling). It has been proven to hybridize very easily with other cyprinids (Blachuta and Witkowski, 1984; Crivelli and Dupont, 1987), namely with species of *Squalius* (Wheeler, 1978; Witkowski and Blachuta, 1980; Kammerad and Wuestemann, 1989). There is great concern about possible hybridization with closely related endangered species (Vinyoles et al., 2007).”

From Kottelat (1997):

“Interferes with [and] probably interbreeds with native congeners [in Italy] (Bianco 2013).”

From ALARM Project (2011):

“Impacts on invaded ecosystem: The bleak is a small cyprinid that feeds mainly on zooplankton. Its native distribution area ranges from the eastern slopes of the Pyrenees to the Urals (Doadrio 2001). Although its impact on the native fish fauna has not been studied in depth, there is concern that it may out-compete native fish due to its high reproductive output. Another potential source of danger is hybridization with native fish. Hybridization has already been reported with cyprinid species of genera *Squalius*, *Blicca*, *Rutilus* and *Abramis*. Besides its impact on native fish fauna, it also affects the trophic dynamic of reservoirs, which are the main source of water for human populations. It feeds on cladocerans and other small invertebrates which play an important role in these ecosystems and whose activity directly affects the water quality.”

Important note: Although *Alburnus alburnus* is known to hybridize with members of the genera *Squalius*, *Blicca*, *Rutilus* and *Abramis*, these genera are not established in the United States (GBIF 2014).

4 Global Distribution

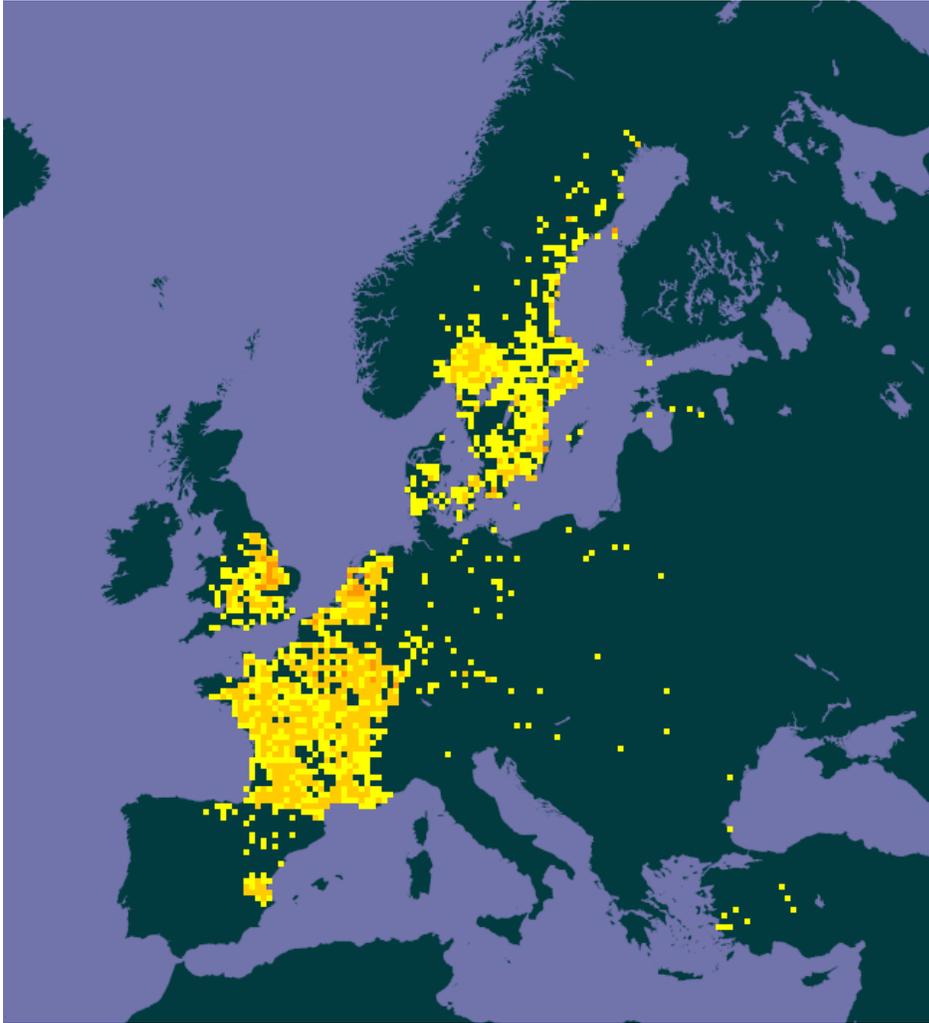


Figure 1. Global distribution of *Alburnus alburnus*. Map from GBIF (2014). Points in Russia, India, and off the coast of France were not included due to incorrect coordinates.

5 Distribution within the United States

This species has not been reported in the United States.

6 CLIMATCH

Summary of Climate Matching Analysis

The climate match (Australian Bureau of Rural Sciences 2008, 16 climate variables; Euclidean Distance) was high in the Great Lakes and in parts of New England, the Mountain West, and the West Coast. Medium matches covered the rest of the U.S. except low matches in the Gulf Coast, Florida, and the extreme Southwest. Climate 6 match indicated that the contiguous U.S. has a high climate match. The range for a high climate match is 0.103 and greater; climate match of *Alburnus alburnus* is 0.381.

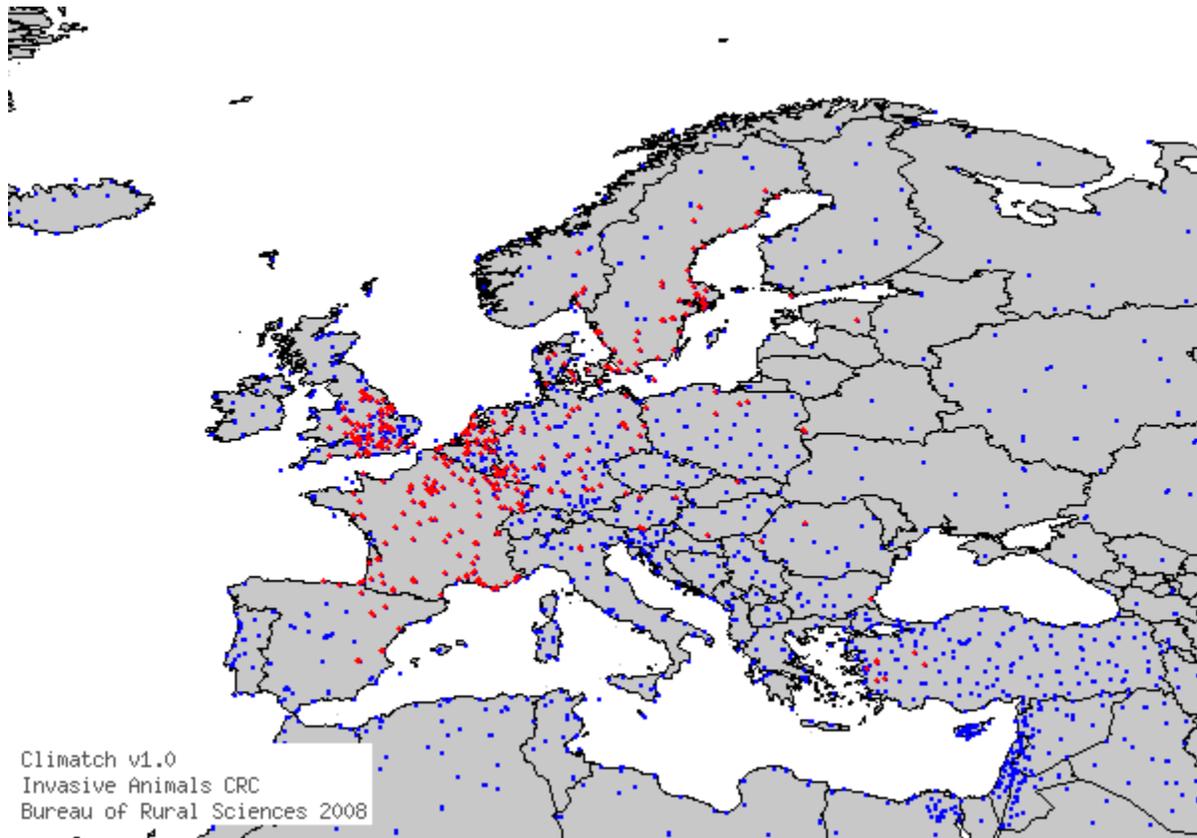


Figure 2. CLIMATCH (Australian Bureau of Rural Sciences 2008) source map showing weather stations selected as source locations (red) and non-source locations (blue) for *Alburnus alburnus* climate matching. Source locations from GBIF (2014).

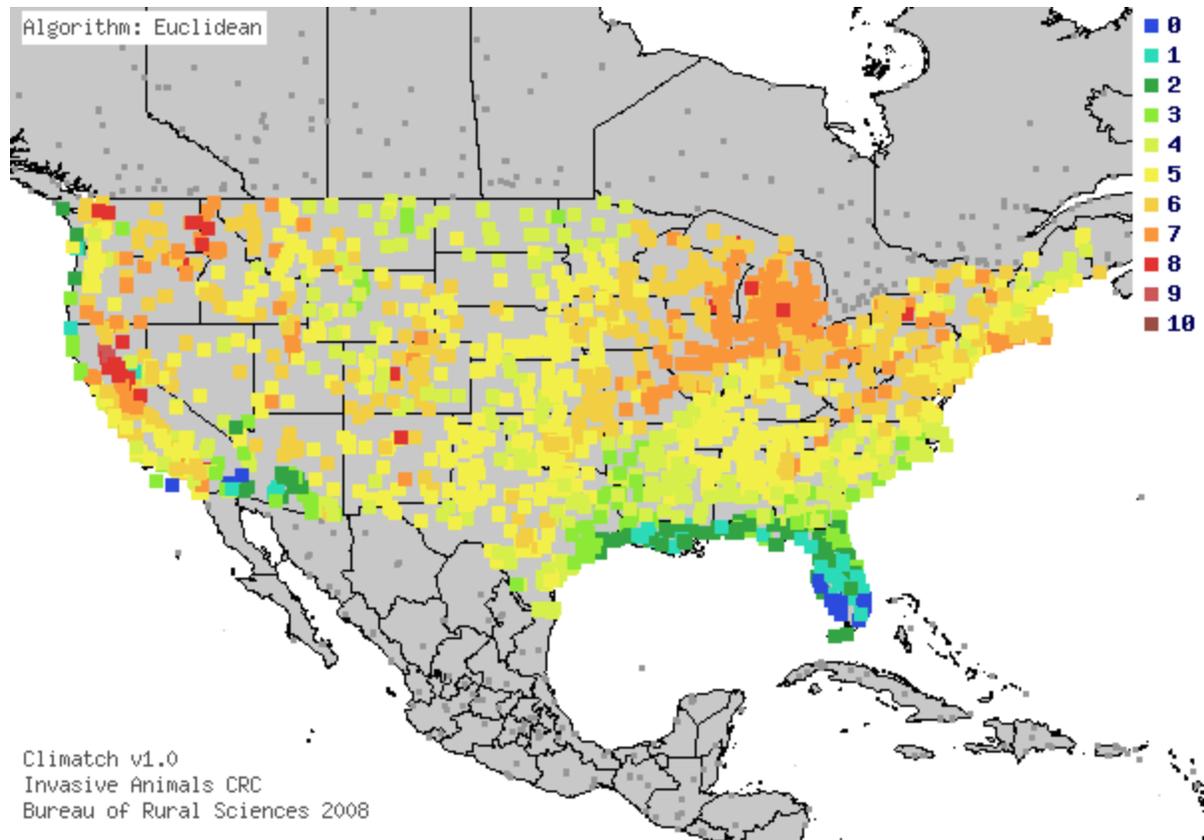


Figure 3. Map of CLIMATCH (Australian Bureau of Rural Sciences 2008) climate matches for *Alburnus alburnus* in the contiguous United States based on source locations reported by GBIF (2014). 0= Lowest match, 10=Highest match.

Table 1. CLIMATCH (Australian Bureau of Rural Sciences 2008) climate match scores.

CLIMATCH Score	0	1	2	3	4	5	6	7	8	9	10
Count	26	52	87	114	321	621	475	243	33	2	0
Climate 6 Proportion =		0.381									

7 Certainty of Assessment

There is a good deal of information on the natural history and range of *Alburnus alburnus*. The only area that lacks definitive information is impacts from introduction. While there is a source that suggests they have outcompeted native species, one that has demonstrated increased algae and eutrophication rates, and several mentions of hybridization, more information would be needed to make this a high certainty of assessment. Therefore the certainty of assessment is medium.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Alburnus alburnus is a freshwater and brackish water fish native to areas of Europe and Asia. This species has established populations in several countries outside of its native range including Spain, Italy, and Cyprus. The spread of this species has been facilitated by stream modifications and by intentional transportation to new areas for use as bait or forage fish for non-native sport fish. This species can form high-density shoals. In some areas this species is competing with native fish for resources, causing increased algal biomass, and hybridizing with native fish, giving this species a high rating for invasiveness. Climate match with the U.S. is high, especially in the Great Lakes area. The overall risk for this species is high.

Assessment Elements

- **History of Invasiveness (See Section 3): High**
- **Climate Match (See Section 6): High**
- **Certainty of Assessment (See Section 7): Medium**
- **Overall Risk Assessment Category: High**

9 References

Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 10.

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10 References Quoted But Not Accessed

Note: The following references are cited within quoted text within this ERSS, but were not accessed for its preparation. They are included here to provide the reader with more information.

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