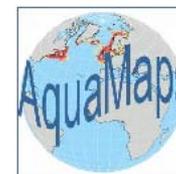


Predicting species distribution using FishBase, SeaLifeBase and AquaMaps



**Christine Marie V. Casal, Kathleen Kesner-Reyes, Ma. Lourdes D. Palomares,
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FishBase

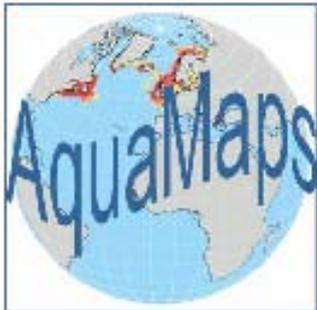
32,100 species and subspecies (finfish), 291,300 common names, 52,600 pictures, 45,750 references, 1,850 collaborators (version 05/2011)

www.fishbase.org



117,300 species (marine non-fish, 25,400 common names, 9,700 pictures, 15,350 references, 207 collaborators (version 05/2011))

www.sealifebase.org



At least 11,500 species mapped, 8,631 for finfish and 2,871 for non-fish (marine invertebrates, all marine mammals, turtles, snakes), 47 algae (ver. 08/2010)

www.aquamaps.org

Information collated in FishBase and SeaLifeBase

Morphology & Physiology

Metabolism ● Gill area

Vision ● Disease

Brain ● Abnormalities

Ecotoxicology ● Swim mode

Distribution

Occurrence ● FAO areas

Country ● Ecosystem

Genetics & Aquaculture

Electrophoresis

Heritability ● Strains

Introductions

Reproduction & Life History

Maturity ● Spawning ● Eggs

Larvae ● Broodstock ● Fry nursery

Larval dynamics ● Larval speed

Trophic Ecology

Ecology ● Predators

Food items

Diet composition

Food consumption

Ration

Fish as Food

Processing ● Ciguatera

FAO catches

Aquaculture

(production)

Population Dynamics

Growth/Mortality ● L/W relations

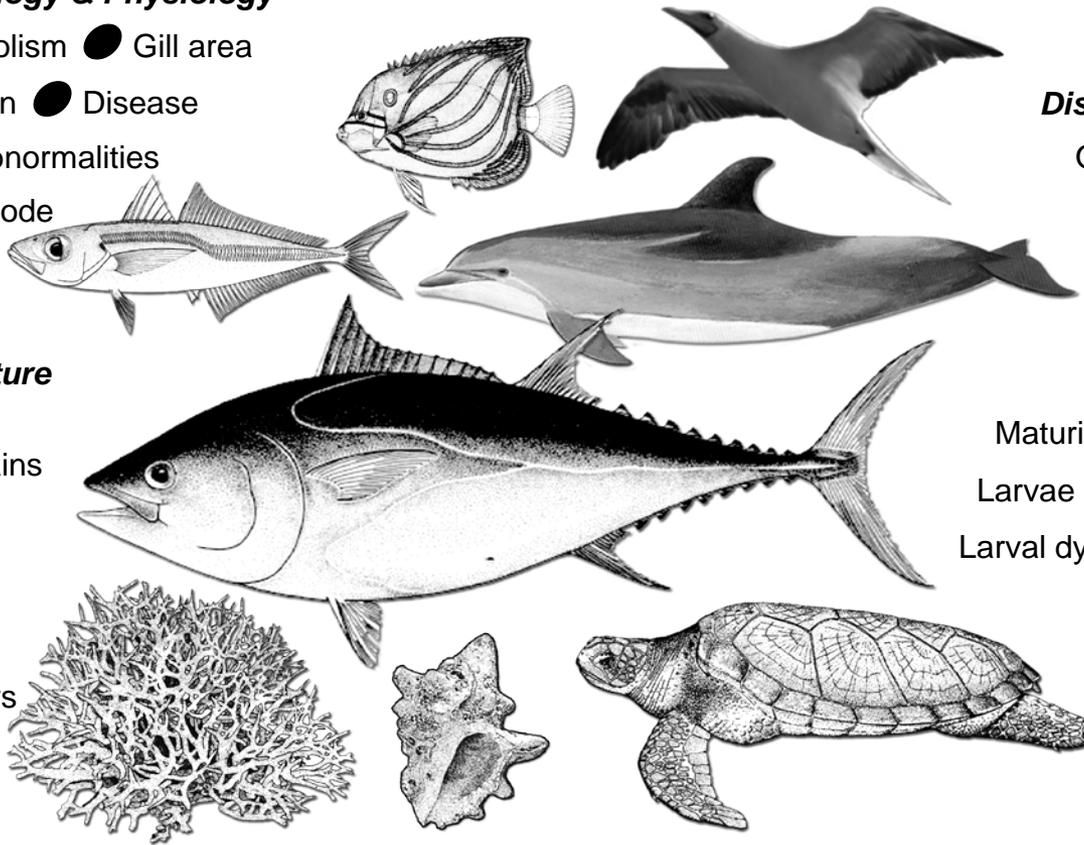
Maximum sizes ● Recruitment

L/L relations ● Length frequency

Other Tables

Pictures ● References

Biblio ● Keys ● Sounds



Information in FishBase

- ★ **Species introductions (~4500 records)**
- ★ **Natural distribution**
- ★ **Establishment**
- ★ **Use (aquaculture or ornamental)**
- ★ **Biological characteristics**

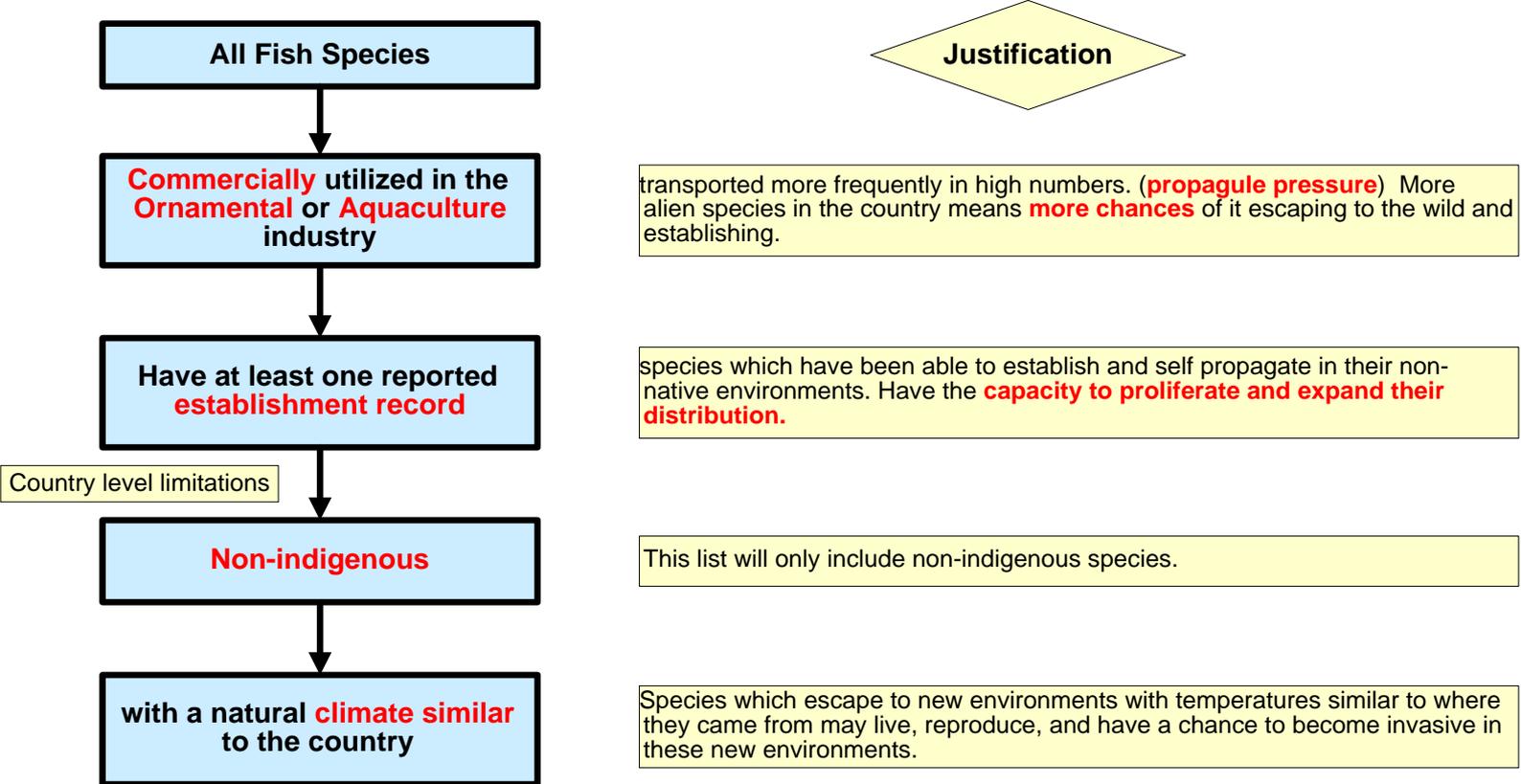
The Invasiveness page

- ★ **reports species which may be able to establish in natural waters of a country.**
- ★ **excludes species which are native or endemic to the country.**

Preliminary table risk assessment based on information from 750 published documents and contributions from collaborators.



Sieves of the Invasiveness Tool





Sieves of the Invasiveness Tool

All Fish Species

Commercially utilized in the Ornamental or Aquaculture industry

Have at least one reported establishment record

Country level limitations

Non-indigenous

with a natural climate similar to the country

Aquaculture and Aquarium Fishes Which May Establish Themselves in Philippines [n = 129]

List of commercial aquaculture and aquarium fishes which match the environmental conditions in Philippines, and which have established themselves in at least one other country.

Refresh FB name Species Family Aquaculture Aquarium Max. length Productivity Other countries

Select: Philippines Percent established: 19%

FB name	Species	Family	Aquaculture	Aquarium	Max length (cm)	Temp. (°C)	Climate zone	Productivity	Established in countries	
									This	Other
Mozambique tilapia	<i>Oreochromis mossambicus</i>	Cichlidae	commercial	commercial	39	17 - 35	tropical	Med.	Yes	110
Nile tilapia	<i>Oreochromis niloticus niloticus</i>	Cichlidae	commercial	never/rarely	60	14 - 33	tropical	Med.	Yes	69
Blue tilapia	<i>Oreochromis aureus</i>	Cichlidae	commercial	commercial	46	8 - 30	tropical	High	Yes	35
Redbreast tilapia	<i>Tilapia rendalli</i>	Cichlidae	commercial	commercial	45	24 - 28	tropical	Med.	No	28
Green swordtail	<i>Xiphophorus hellerii</i>	Poeciliidae	never/rarely	highly commercial	14	22 - 28	tropical	High	No	28
Redbelly tilapia	<i>Tilapia zillii</i>	Cichlidae	commercial	commercial	40	11 - 36	tropical	Med.	Yes	24
Longfin tilapia	<i>Oreochromis macrochir</i>	Cichlidae	commercial	never/rarely	43	18 - 35	tropical	High	No	20
-more info-	<i>Oreochromis urolepis hornorum</i>	Cichlidae	commercial	commercial	24	22 - 26	tropical	High	No	20
Southern platyfish	<i>Xiphophorus maculatus</i>	Poeciliidae	never/rarely	commercial	4	18 - 25	tropical	High	No	17
Jaguar guapote	<i>Parachromis managuensis</i>	Cichlidae	commercial	commercial	55	25 - 36	tropical	Med.	Yes	12
Giant gourami	<i>Osphronemus goramy</i>	Osphronemidae	commercial	commercial	70	20 - 30	tropical	Med.	Yes	11
Peacock cichlid	<i>Cichla ocellaris</i>	Cichlidae	commercial	commercial	74	24 - 27	tropical	High	No	9
Cachama	<i>Colossoma macropomum</i>	Characidae	commercial	public aquariums	108	22 - 28	tropical	Med.	Yes	8
Snakeskin gourami	<i>Trichogaster pectoralis</i>	Osphronemidae	commercial	highly commercial	25	23 - 28	tropical	Med.	Yes	8





Fishes (42) introduced and established in Philippine waters

Order	Family	Species	Status	FB name	Name
Perciformes	Cichlidae	<i>Amatitlania nigrofasciata</i>	introduced	Convict cichlid	Convict
Perciformes	Anabantidae	<i>Anabas testudineus</i>	introduced	Climbing perch	Liwalo
Cyprinodontiformes	Rivulidae	<i>Austrolebias nigripinnis</i>	introduced	Blackfin pearlfish	
Cypriniformes	Cyprinidae	<i>Barborymus gonionotus</i>	introduced	Java barb	Tawes
Cypriniformes	Cyprinidae	<i>Carassius auratus auratus</i>	introduced	Goldfish	Tawes
Cypriniformes	Cyprinidae	<i>Carassius carassius</i>	introduced	Crucian carp	Wild goldfish
Perciformes	Channidae	<i>Channa striata</i>	introduced	Snakehead murrel	Anak dalag
Cypriniformes	Cyprinidae	<i>Cirrhinus cirrhosus</i>	introduced	Mrigal	
Siluriformes	Clariidae	<i>Clarias batrachus</i>	introduced	Walking catfish	Hitong batukan
Siluriformes	Clariidae	<i>Clarias gariepinus</i>	introduced	North African catfish	
Characiformes	Characidae	<i>Colossoma macropomum</i>	introduced	Tambaqui	
Cypriniformes	Cyprinidae	<i>Cyprinus carpio carpio</i>	introduced	Common carp	Karpa
Cyprinodontiformes	Fundulidae	<i>Fundulus heteroclitus heteroclitus</i>	introduced	Mummichog	
Cyprinodontiformes	Poeciliidae	<i>Gambusia affinis</i>	introduced	Mosquitofish	Isdang canal
Cypriniformes	Cyprinidae	<i>Gibelion catla</i>	introduced	Catla	
Perciformes	Helostomatidae	<i>Helostoma temminckii</i>	introduced	Kissing gourami	Kissing gourami
Cypriniformes	Cyprinidae	<i>Hypophthalmichthys nobilis</i>	introduced	Bighead carp	
Siluriformes	Loricariidae	<i>Hypostomus plecostomus</i>	introduced	Suckermouth catfish	Plecostomus
Siluriformes	Ictaluridae	<i>Ictalurus punctatus</i>	introduced	Channel catfish	Channel catfish
Cypriniformes	Cyprinidae	<i>Labeo rohita</i>	introduced	Rohu	Rohu
Perciformes	Centrarchidae	<i>Lepomis cyanellus</i>	introduced	Green sunfish	
Perciformes	Centrarchidae	<i>Lepomis macrochirus</i>	introduced	Bluegill	Sunfish
Perciformes	Centrarchidae	<i>Micropterus salmoides</i>	introduced	Largemouth bass	
Cypriniformes	Cobitidae	<i>Misgurnus anguillicaudatus</i>	introduced	Oriental weatherfish	Dojo
Perciformes	Cichlidae	<i>Oreochromis aureus</i>	introduced	Blue tilapia	Tilapia
Perciformes	Cichlidae	<i>Oreochromis mossambicus</i>	introduced	Mozambique tilapia	Mozambique tilapia
Perciformes	Cichlidae	<i>Oreochromis niloticus niloticus</i>	introduced	Nile tilapia	Pla pla
Perciformes	Cichlidae	<i>Oreochromis spilurus spilurus</i>	introduced	Sabaki tilapia	
Perciformes	Osphronemidae	<i>Osphronemus goramy</i>	introduced	Giant gourami	Goramy
Siluriformes	Pangasiidae	<i>Pangasianodon hypophthalmus</i>	introduced	Sutchi catfish	
Perciformes	Cichlidae	<i>Parachromis managuensis</i>	introduced	Guapote tigre	Managuense
Cyprinodontiformes	Poeciliidae	<i>Poecilia latipinna</i>	introduced	Sailfin molly	Bubuntis
Cyprinodontiformes	Poeciliidae	<i>Poecilia reticulata</i>	introduced	Guppy	Guppy
Cyprinodontiformes	Poeciliidae	<i>Poecilia sphenops</i>	introduced	Molly	Molly
Siluriformes	Loricariidae	<i>Pterygoplichthys disjunctivus</i>	introduced	Vermiculated sailfin catfish	
Siluriformes	Loricariidae	<i>Pterygoplichthys pardalis</i>	introduced	Amazon sailfin catfish	
Cypriniformes	Cyprinidae	<i>Puntius tetrazona</i>	introduced	Sumatra barb	Tiger barb
Perciformes	Cichlidae	<i>Tilapia zillii</i>	introduced	Redbelly tilapia	Zill's tilapia
Perciformes	Osphronemidae	<i>Trichogaster leerii</i>	introduced	Pearl gourami	Pearl gourami
Perciformes	Osphronemidae	<i>Trichogaster pectoralis</i>	introduced	Snakeskin gourami	Snakeskin gourami
Perciformes	Osphronemidae	<i>Trichogaster trichopterus</i>	introduced	Three spot gourami	Blue gourami



Of the 41 species listed, 16 are established in Philippine waters!

Introduced Species with Adverse Effects (n = 41)		
SPECIES	ENGLISH NAME	NUMBER OF COUNTRIES that report adverse ecological effects
<i>Cyprinus carpio carpio</i>	Common carp	22
<i>Oncorhynchus mykiss</i>	Rainbow trout	22
<i>Oreochromis mossambicus</i>	Mozambique tilapia	22
<i>Oreochromis niloticus niloticus</i>	Nile tilapia	16
<i>Micropterus salmoides</i>	Largemouth black bass	14
<i>Salmo trutta trutta</i>	Sea trout	13
<i>Pseudorasbora parva</i>	Stone moroko	12
<i>Carassius auratus auratus</i>	Goldfish	10
<i>Gambusia affinis</i>	Mosquitofish	9
<i>Hypophthalmichthys molitrix</i>	Silver carp	9
<i>Lepomis gibbosus</i>	Pumpkinseed	9
<i>Ameiurus melas</i>	Black bullhead	8
<i>Poecilia reticulata</i>	Guppy	8
<i>Clarias gariepinus</i>	North African catfish	6
<i>Lepomis macrochirus</i>	Bluegill	6
<i>Neogobius melanostomus</i>	Round goby	6
<i>Clarias batrachus</i>	Philippine catfish	5
<i>Ctenopharyngodon idella</i>	Grass carp	5
<i>Esox lucius</i>	Northern pike	5
<i>Salvelinus fontinalis</i>	Brook trout	5
<i>Ameiurus nebulosus</i>	Brown bullhead	4
<i>Carassius gibelio</i>	Prussian carp	4
<i>Lates niloticus</i>	Nile perch	4
<i>Odontesthes bonariensis</i>	Argentinian silverside	4
<i>Xiphophorus helleri</i>	Green swordtail	4
<i>Gymnocephalus cernua</i>	Ruffe	3
<i>Hemiculter leucisculus</i>	Sharpbelly	3
<i>Heterotis niloticus</i>	African bonytongue	3
<i>Hypophthalmichthys nobilis</i>	Bighead carp	3
<i>Limnothrissa miodon</i>	Lake Tanganyika sardine	3
<i>Micropterus dolomieu</i>	Smallmouth bass	3
<i>Parachromis managuensis</i>	Jaguar guapote	3
<i>Perca fluviatilis</i>	European perch	3
<i>Perccottus glenii</i>	Chinese sleeper	3
<i>Pimephales promelas</i>	Fathead minnow	3
<i>Poecilia latipinna</i>	Sailfin molly	3
<i>Pterygoplichthys disjunctivus</i>	Vermiculated sailfin catfish	3
<i>Sarotherodon melanotheron melanotheron</i>	Blackchin tilapia	3
<i>Silurus glanis</i>	Wels catfish	3
<i>Tilapia rendalli</i>	Redbreast tilapia	3
<i>Tilapia zillii</i>	Redbelly tilapia	3



Alien/Invasive Species Databases for *Oreochromis mossambicus*

[n=10]

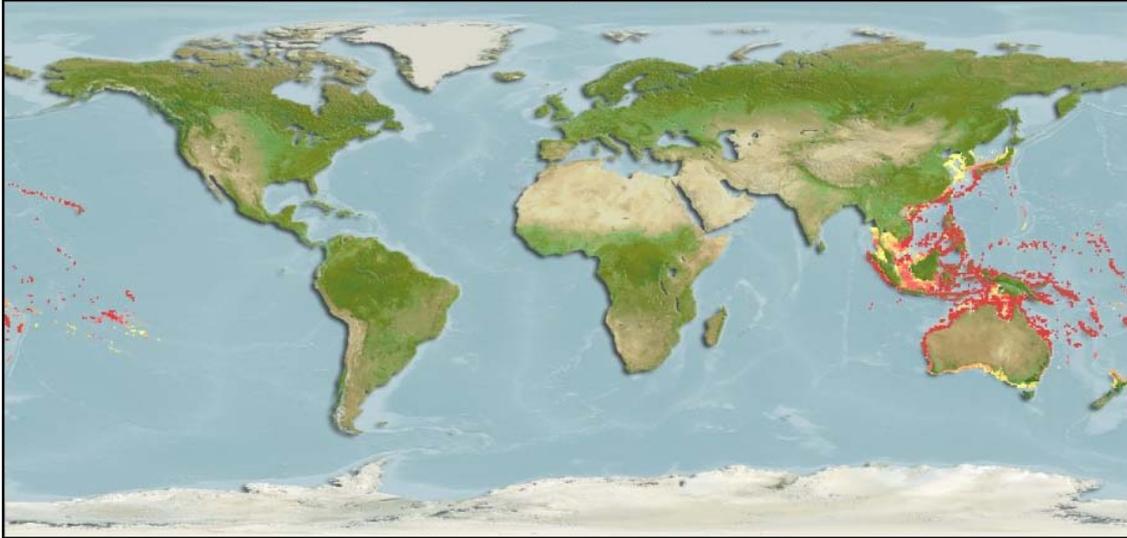
Name	Description
GISD	Global Invasive Species Database
USGS	Nonindigenous Aquatic Species
BASD	Brazilian Alien Species Database
NOBANIS	North European and Baltic Network on Invasive Alien Species
IABIN Jamaica	IABIN Jamaica
IABIN Ecuador	IABIN Ecuador
IABIN Columbia	IABIN Columbia
IABIN Brazil	IABIN Brazil
DIAS	FAO's Database on Introductions of Aquatic Species
DIAS	FAO's Database on Introductions of Aquatic Species



What are AquaMaps?

- ✦ **Model-based, large-scale predictions of known natural occurrence of marine species**
- ✦ **Originally developed by Kaschner *et al.* (2006) to predict global distributions of marine mammals**
- ✦ **Uses estimates of environmental tolerances of a species with respect to a set environmental parameters**
- ✦ **Predictions made by matching species tolerances (environmental envelope) against local environmental conditions to determine suitability of area for a given species**
- ✦ **Probabilities of species occurrence shown in color-coded species range map (0.5° x 0.5° resolution)**

[Native range](#) |
 [Suitable habitat](#) |
 [PointMap](#) |
 [Year 2050 range](#)



[Native range](#) |
 [Suitable habitat](#) |
 [PointMap](#) |
 [Year 2050 range](#)

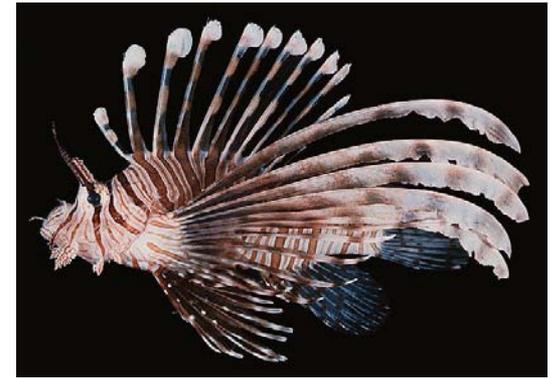


Figure 6. *Pterois volitans* (photo by J. E. Randall).

Now reported in the Bahamas, Belize, Bermuda, Colombia, Costa Rica, Dominican Republic, Honduras, Jamaica, Mexico, Nicaragua, Panama, Puerto Rico and Venezuela among others



Key points:

- FishBase only handles fishes - marine, brackish and fresh
- SeaLifeBase handles other marine taxa (e.g. marine mammals, crustaceans, etc.)
- SeaLifeBase can be used as a shell to create a freshwater invertebrate database.
- Developing countries with limited funds for biodiversity assessment/monitoring and management much less risk assessments would benefit from the information available in the databases. Developing tools to assist countries (developing) in their reporting accountabilities to the CBD and other such fora is also important. The tools which we are trying to develop are to fill the void of these types of knowledge in these countries.
- We are looking towards building tools to improve the capacity of the resource managers and decision-makers. We are aware that the tools we have developed could be further improved with more collaborative efforts (data and tool design) with more partners both in the developing and developed countries.
- Keeping information updated/current and freely available to all has a cost and through the years it has become more and more difficult to secure funding to continue the work.



Some ideas for possible collaboration:

- With IUCN - validation of individual species maps with IUCN species distribution maps (e.g., maybe overlay of IUCN shapefiles with AquaMaps).
- With University of Melbourne-on estimating global species richness. Can our respective maps complement each other? If their global museum collection is not served in GBIF or OBIS, maybe this can also be used to validate our species richness maps.
- With SCAR-MARBIN – maybe an AquaMaps for Antarctica? We'd be interested in occurrence data and completing our species data (e.g., depth, bounding box, demersal/epipelagic) for Antarctic species.
- On marine alien and invasive species-simple map overlay of introduction records on AquaMaps All Suitable Habitat map for a species. Current 5-classes of relative probabilities of occurrence in AquaMaps native range map can be converted to, say, 3 or 4-levels (colors) of potential invasiveness (low, medium, high, very high) and the 5th color would be the introduction records); else, AquaMaps predictions can be rendered in csv (possibly even KML) format for GIS overlay.



Some ideas for possible collaboration:

- With **BirdLife International** – possibility of generating **AquaMaps for seabirds**. List of seabirds has already been cross-referenced with SLB for corresponding data/data gaps (for AquaMaps generation).
- Freshwater AquaMaps-already working on Europe, Americas, Africa; for Asia, we need coverage for countries other than China; also, **no freshwater AquaMaps for Australasia yet**.
- Deep-sea corals: AquaMaps for deep-sea corals? Particularly interested in this when last year, a cache of black corals estimated to be 2x-5x the size of Manila (~3T sqm) was confiscated in Mindanao. We do not know if these came from-PHL waters or transshipment through PHL only. Question remains on where they were harvested.
- Climate change: Does anyone have **environmental data (sea temp, salinity, primary productivity, ice concentration) for other emissions scenarios?**

Thank You



For clarifications and collaboration do contact:

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Open iTunes to buy and download apps.



[View In iTunes](#)

Description

The Fish Quiz is an educational game based on the best scientific knowledge about over 2000 species of marine and freshwater fishes. Have fun choosing the right environment, size, food, sex, and home for the fish in the photo. True fish sounds comment your choice. Learn as you play. Fish enthusiasts may score 50% correct answers, whereas fish

[FIN – FishBase Information and Research Group Web Site](#) ▶ [Fish Quiz Support](#) ▶ [...More](#)

What's New in Version 1.0.1

Bug fix: URL linking the globe icon to speciesbase.mobi was replaced with correct link.

This app is designed for both iPhone and iPad

\$0.99

Category: [Education](#)
Updated: May 15, 2011
Current Version: 1.0.1
1.0.1
Size: 180 MB
Language: English
Seller: FishBase Information & Research Group, Inc.
© FIN Inc.
[Rated 4+](#)

Requirements: Compatible with iPhone, iPod touch, and iPad. Requires iOS 3.2 or later

Customer Ratings

We have not received enough ratings to display an average for the current version of this application.

Screenshots

iPhone | iPad

