

# Marine Pests in Southern NSW

Keeping your boat and gear clean will

- Save money on fuel
- Increase boat performance
- Stop the spread of marine pests



Photo by Helen Davies



Primary  
Industries



Southern Rivers  
CMA  
CATCHMENT MANAGEMENT AUTHORITY



EUROBODALLA SHIRE COUNCIL



Bega Valley Shire Council



Shoalhaven  
City Council



## Keep your boat and fishing gear clean to help stop the spread of marine pests

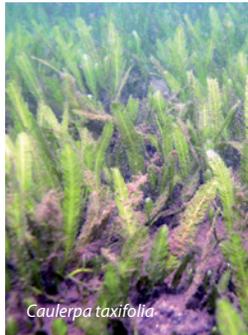
NSW's marine life faces threats from introduced marine plants and animals. Marine pests can also have severe impacts on recreational boating and fishing and marine industries.



Japanese seaweed

Pristine south coast estuaries are a haven for both recreational boaters and fishers. NSW Department of Primary Industries (NSW DPI, formerly Industry and Investment NSW) is working collaboratively with the Southern Rivers Catchment Management Authority (SRCMA) and local government to provide environmental educational programs to ensure that the beauty of the natural environment and the associated economic and social benefits to surrounding communities remain.

The seaweed *Caulerpa taxifolia* and the European shore crab are two marine pest species that have known established populations in some estuaries on the south coast, and action needs to be taken to avoid other pest species arriving and becoming established. Other potential invasive species to keep a look out for include the Asian bag mussel, Northern Pacific seastar and Japanese seaweed.



*Caulerpa taxifolia*

## Marine pests can affect your boat

- They damage the paint and hull where they attach
- They increase drag and therefore fuel costs
- They increase maintenance costs
- They clog pipes, motors or propellers causing engine overheating



Mussels on propeller/engine shaft

## Marine pests can affect your fishing

- They increase pressure on fish populations by competing for food, damaging their habitats, or preying on them
- They can displace native fish populations
- A pest outbreak can result in fishing closures to stop the pest spreading further
- The Northern Pacific seastar can even steal your bait!

## How you can help!

**Check and clean your boat and fishing gear regularly using the simple steps on pages 4 to 9, to make sure you are not spreading pests or introduced fouling species.**

You may be carrying marine pests on your boat or fishing gear. You could unknowingly be spreading them to your favourite destinations. Cleaning your boat and fishing gear will help stop the spread of marine pests. It will also reduce your fuel costs and increase the life of your boat and gear.

**Learn to identify important existing or potential marine pests – see pages 10 to 23 for some pests already in NSW and Australia. If you see existing pests in new locations or new suspected marine pests in NSW, please report them immediately!**

NSW DPI's 24hr recorded aquatic pest hotline (02) 4916 3877  
email: [aquatic.pests@industry.nsw.gov.au](mailto:aquatic.pests@industry.nsw.gov.au)

*Note the location and take photos or collect a sample and freeze in a plastic bag to enable NSW DPI to confirm your sighting.*

**For more information on these and other potential pests, please visit: <http://www.dpi.nsw.gov.au>**

# Follow these simple steps to make sure pests aren't hitchhiking on your gear!

## FISHING EQUIPMENT

It is important to clean your fishing gear when leaving a location to remove any potential fragments of unwanted marine pests before using your gear in a different location. Put any debris into a sealed bag in a rubbish bin to avoid spreading aquatic pests.

Fishing equipment includes any gear likely to get wet when fishing such as fishing rods, waders, tackle boxes, shoes/boots etc.

### Follow these 4 simple steps!

1. Thoroughly **CHECK** all equipment and remove any weeds, marine organisms or sediment, and place in the bin NOT back in the water.
2. **CLEAN** all equipment in freshwater.
3. **DRAIN** the water from equipment away from any waterway.
4. Leave to **DRY** in direct sunlight (some equipment may take several days to dry completely).

A mild detergent may be used to clean porous equipment such as shoes/boots, soft foam or cork rod handles and waders.

### How anglers can help prevent the spread of pests!

Recreational anglers are often the first to notice new or suspected pest species in NSW waterways and can provide valuable information on new incursions of aquatic pests by reporting new sightings to NSW DPI immediately.

- Don't transfer live fish between waterways and don't use live fish as bait in freshwater or any fish or any part of a fish not native to the waters of NSW (other than dead carp) – it's illegal!
- Don't return aquatic pests including vegetation (such as *Caulerpa taxifolia*) to the water - if you catch or find a known pest species dispose of it appropriately.



Wash your fishing rods/reels in freshwater after each use. Photo by Debra Ballagh



Use mild detergent to clean boating equipment. Photo by Debra Ballagh

# Follow these simple steps to make sure pests aren't hitchhiking on your boat!

## TRAILER BOATS, CANOES, KAYAKS, JETSKIS

It is important to clean your vessel after leaving a location to ensure that you aren't carrying any unwanted marine pests or introduced fouling species to your next location. Follow these 4 key steps to keep your boat and gear clean and dry. Target the areas shown in the diagram.

### Follow these 4 simple steps!

1. **CHECK** for and remove any weeds, animals or sediment from your boat, trailer and gear and put it in the bin – NOT back in the water.
2. After each trip **CLEAN** your boat, trailer and gear with freshwater, in your yard or at a carwash. If you can't do this because of water restrictions go to the next step.

3. **DRAIN** all the water from your boat and gear, but don't let it drain back into the sea.
4. **DRY** your boat and gear completely, including ropes and anchor. Tiny eggs and plant spores can survive in a damp area for months.

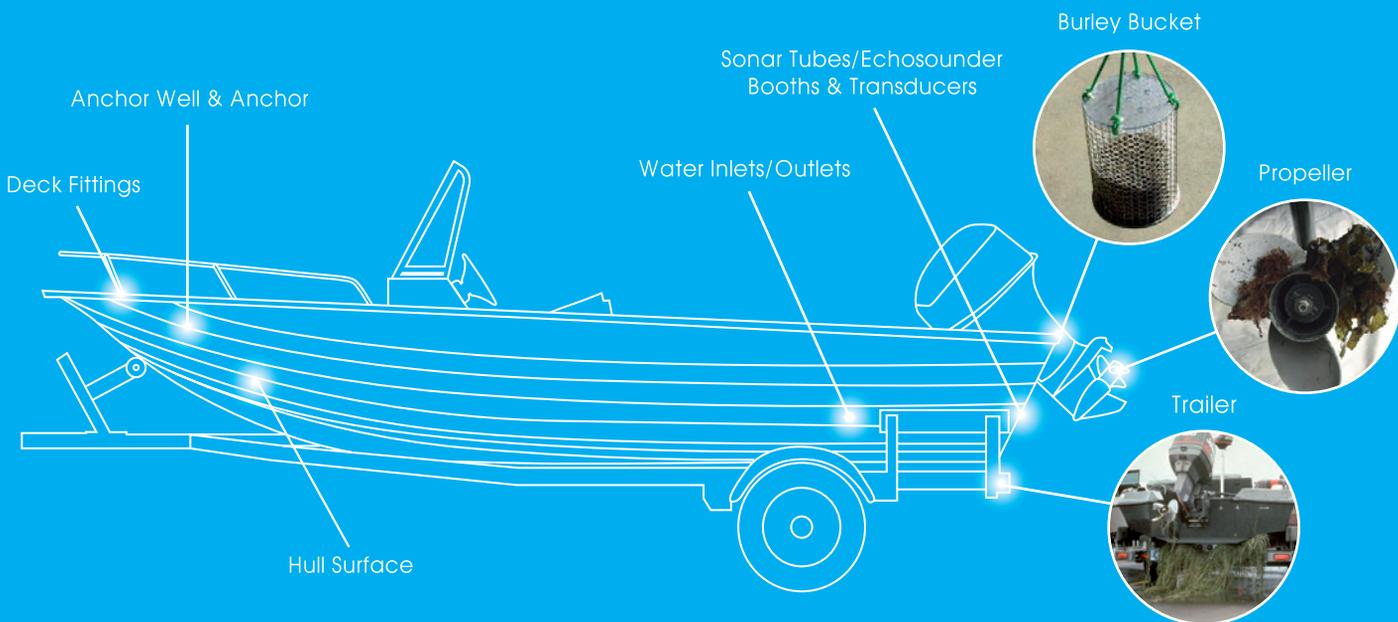


Diagram and photos courtesy of BIA VIC

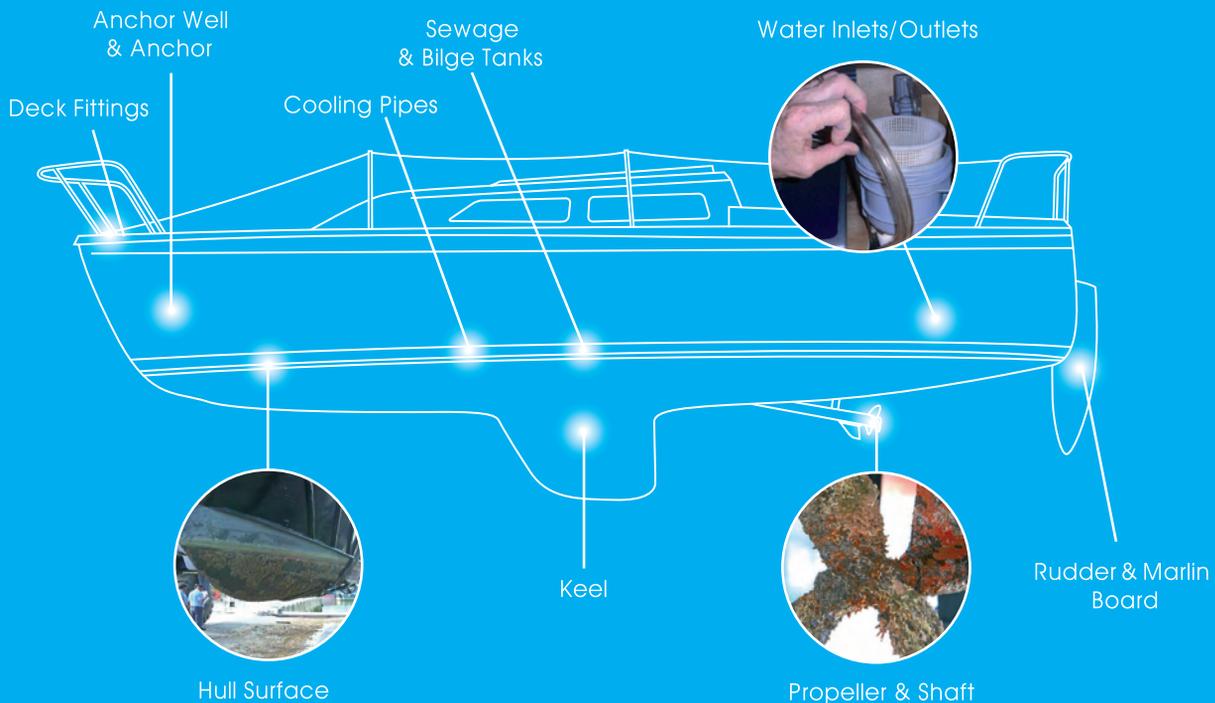
# Follow these simple steps to make sure pests aren't hitchhiking on your boat!

## MOORED BOATS

Moored boats present several niche areas for marine pests and introduced fouling species to settle and grow undetected beneath the water level. It's crucial to make sure your boat is clean before you move it to ensure unwanted marine pests are not carried into a new location. Follow these 5 key steps and target the areas shown in the diagram.

### Follow these 5 simple steps!

1. Slip and **CLEAN** your boat regularly, at least every year and anytime there is a build up of fouling.
2. Select an antifouling paint suited to your boat's activity, and apply it correctly following the manufacturer's advice. Renew it when persistent fouling occurs.
3. **CHECK** your boat for fouling every month (any plants or animals attached to your hull, propellers, anchor, cables, fenders, cordage, tenders etc).
4. **TREAT** internal seawater systems regularly – flush with freshwater or an approved treatment.
5. **DISPOSE** of sewage and bilge water at an approved pump out facility. Waste could contain marine pests, their eggs or plant spores.



# MARINE PEST FOUND IN NSW

## CAULERPA *Caulerpa taxifolia*



Photo: NSW DPI

Froned height 3-25cm

Flattened fronds, bright green colour. Known to turn pale & white during winter in colder waters

Leaflets on fronds attach directly opposite each other, curve upwards

Leaflets constricted at base

### KNOWN LOCATIONS:

Found in several NSW estuaries and coastal lakes including:

- Brisbane Water
  - Hawkesbury River
  - Pittwater
  - Port Jackson
  - Botany Bay
  - Port Hacking
  - St Georges Basin
  - Lake Conjola
  - Narrawallee Inlet
  - Burrill Lake
  - Durras Lake
  - Clyde River / Batemans Bay
  - Wallagoot Lake
- Also found in SA

### HABITAT:

- Sand or rock in sheltered and moderately exposed areas
- Has not been found in depths greater than 12m in NSW

### IMPACTS:

- May compete with native seagrasses
- May adversely affect shellfish living in sediments
- Entangles in boat anchors, fishing nets and trawling gear

# SIMILAR NATIVE SPECIES



Photo: David Harasti

### *Caulerpa filiformis*

#### KEY FEATURES:

Flattened strap-like fronds (not fern-like)

#### HABITAT:

Exposed and sheltered rocky reef and sandy areas, to 6m depth  
Common between Port Stephens and Jervis Bay



Photo: John Huisman, Marine Plants of Australia

### *Caulerpa scalpelliformis*

#### KEY FEATURES:

Fern-like fronds with leaflets either side of fronds not directly opposite each other

#### HABITAT:

Exposed rocky reef to 36m depth



Photo: John Huisman, Marine Plants of Australia

### *Caulerpa flexilis*

#### KEY FEATURES:

Fern-like branchlets with secondary leaflets

#### HABITAT:

Exposed rocky reef to 40m depth  
More common in deeper water



Photo: John Huisman, Marine Plants of Australia

### *Caulerpa cactoides*

#### KEY FEATURES:

Short rounded club-like leaflets

#### HABITAT:

Sheltered and less exposed sand, mud and rock surfaces up to 38m depth

REPORT NEW LOCATIONS

See NSW DPI website for up-to-date information [www.dpi.nsw.gov.au](http://www.dpi.nsw.gov.au)

# MARINE PEST FOUND IN NSW

## EUROPEAN/GREEN SHORE CRAB

*Carcinus maenas*

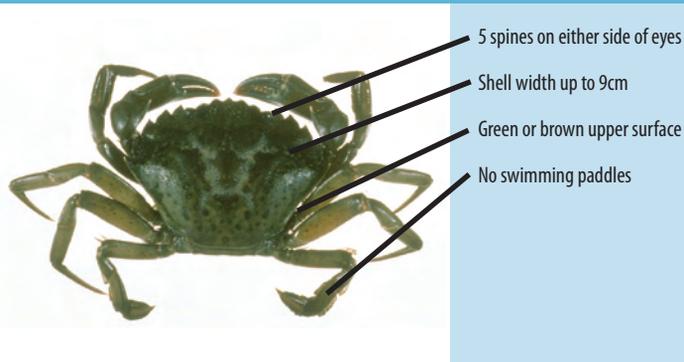


Photo: © CSIRO

### KNOWN LOCATIONS:

Clyde River / Batemans Bay  
Tomaga River  
Candlagan Creek  
Coila Lake  
Wagonga Inlet  
Nangudga Lake  
Corunna Lake  
Tilba Tilba Lake  
Bermagui River  
Cuttagee Lake  
Wapengo Lake  
Nelson Lagoon  
Merimbula Lake  
Pambula Lake  
Curalo Lagoon  
Twofold Bay  
Shadracks Creek  
Nullica River  
Towamba River / Kiah Inlet  
Fisheries Creek  
Wonboyn Lake  
Nadgee Lake

Also found in SA, Vic, Tas

### HABITAT:

- Shallow intertidal areas of bays and estuaries
- Typically amongst rocks with oysters or in mangroves

### IMPACTS:

- Competes with native species
- Feeds on native shellfish and other crabs
- Potential impacts on aquaculture and fisheries

# SIMILAR NATIVE SPECIES



Photo: Graham Edgar, Australian Marine Life

Four-lobed swimming crab

*Thalamita sima*

#### KEY FEATURES:

Has swimming paddles  
5 spines either side of eyes  
Green/yellow colour

#### HABITAT:

Sheltered reef and sand up to 34m depth



Photo: Graham Edgar, Australian Marine Life

Surf crab/Sand crab  
*Ovalipes australiensis*

#### KEY FEATURES:

Two red oval patches towards the rear  
Light grey/sand colour

#### HABITAT:

Sandy beaches up to 34m depth



Photo: © Leon Altoff

Red swimmer crab

*Nectocarcinus integrifrons*

#### KEY FEATURES:

Purple-red/brown colour  
4 spines either side of eyes  
Slightly hairy, claws black at tips, no swimming paddles

#### HABITAT:

Sheltered seagrass and seaweed up to 20m depth



Photo: Michael Marmach, Museum Victoria

Red bait crab

*Plagusia chabrus*

#### KEY FEATURES:

Hairy body and legs with spines on legs  
Red/brown/orange colour  
Shell up to 7cm wide  
Deeply notched between the eyes

#### HABITAT:

Prefers subtidal reefs up to 8m depth

**REPORT NEW LOCATIONS**

See NSW DPI website for up-to-date information [www.dpi.nsw.gov.au](http://www.dpi.nsw.gov.au)

# MARINE PEST FOUND IN NSW

## EUROPEAN FAN WORM

*Sabella spallanzanii*

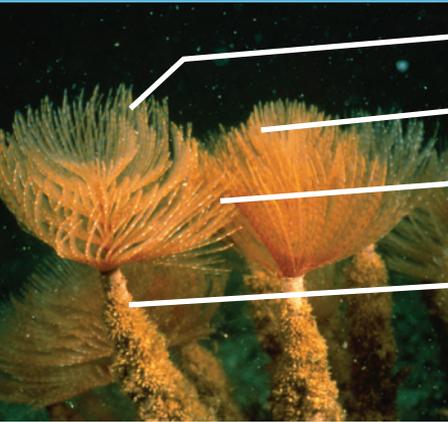


Photo: © CSIRO

- Fan colour varies: white/ orange/brown
- Fan often has brightly banded colours
- Feeding tentacles (radiole) form spiralled fan up to 20cm long
- Flexible tube up to 40cm

### KNOWN LOCATIONS:

- Twofold Bay, NSW
- WA, SA, Vic, Tas

### HABITAT:

- Sheltered waters up to 30m depth
- Soft sediments and hard surfaces such as wharf/marina piles, channel markers, submerged wrecks and pontoons

### IMPACTS:

- Fouls artificial structures and soft sediments
- Competes for food and space with native species and can inhibit their settlement
- Clogs dredges and nets increasing sorting times for commercial fishers

# SIMILAR NATIVE SPECIES



Photo: Roger Steene

Feather-duster worm/Banded fan worm/Southern fan worm  
*Sabellastarte australiensis*

### KEY FEATURES:

Feeding tentacles not spiralled, up to 15cm diameter  
Banded white and purple/brown

### HABITAT:

Exposed rocky reefs up to 30m depth



Photo: David Harasti

Anemone horseshoe worm  
*Phoronis australis*

### KEY FEATURES:

Velvet black colour, tube length up to 20cm

### HABITAT:

Silty/sandy sheltered areas, up to 30m depth



Photo: Mark Norman, Museum Victoria

*Sabellastarte sp.*

### KEY FEATURES:

Feeding tentacles not spiralled  
Banded white/purple/orange/ brown

Shorter tube up to 5cm  
Usually solitary not in clumps

### HABITAT:

Exposed rocky reef and artificial structures in areas of good current flow, up to 200m depth

REPORT NEW LOCATIONS

See NSW DPI website for up-to-date information [www.dpi.nsw.gov.au](http://www.dpi.nsw.gov.au)

# MARINE PEST FOUND IN NSW

## NEW ZEALAND SCREW SHELL

*Maoricolpus roseus*



Photo: © CSIRO

Smooth spiralled cone (no beads) up to 9cm long

Yellow/red-brown in colour, often marbled or streaked



Photo: © CSIRO

### KNOWN LOCATIONS:

- Twofold Bay and continental shelf off Merimbula and Bermagui, NSW
- Vic and Tas

### HABITAT:

- Lying on, or partially buried in sand, mud or gravel
- Intertidal to subtidal
- From 1-130m depth

### IMPACTS:

- Densely blankets sea floor with live and dead shells
- Can affect growth of scallops and displace native shellfish

# SIMILAR NATIVE SPECIES



Photo: Patty Jansen, Australian Shells

Mud whelk  
*Velacumantus australis*

### KEY FEATURES:

Broader, rough spiralled shell up to 2-5cm long  
Dull grey colour

### HABITAT:

Soft sediments in sheltered waters, estuaries, mangroves, tidal flats, seagrasses



Photo: Holly Barlow, Australian Museum

Native screw shell  
*Gazameda gunnii*

### KEY FEATURES:

Shorter shell up to 5-6cm long  
More mottled appearance, lighter colouration – white/light brown  
Has fine beads forming ridges around the shell

### HABITAT:

Inner continental shelf at depths to 140m



Photo: Patty Jansen, Australian Shells

Hercules club whelk/Mud whelk  
*Pyrazus ebeninus*

### KEY FEATURES:

Dark brown shell with flaring lip  
Up to 11cm long

### HABITAT:

Mudflats and mangrove swamps in estuaries

REPORT NEW LOCATIONS

See NSW DPI website for up-to-date information [www.dpi.nsw.gov.au](http://www.dpi.nsw.gov.au)

# MARINE PEST FOUND IN AUSTRALIA

## NORTHERN PACIFIC SEASTAR

*Asterias amurensis*



Photo: © CSIRO

Five pointed arms with radius up to 23cm

Upturned tips, pointed spines (two rows on underside)

Juveniles are yellow with purple markings (adults more yellow)

### ORAL SURFACE (Underside)

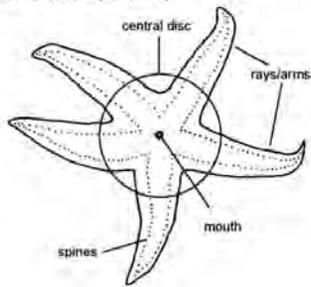


Diagram: © CSIRO

### KNOWN LOCATIONS:

- Found in Vic and Tas
- Not known to occur in NSW

### HABITAT:

- All surfaces such as mud, sand and rock in sheltered areas
- Intertidal zone up to 25m depth, occasionally to 200m depth

### IMPACTS:

- Voracious predator, consumes many bivalves and other small invertebrates
- Impacts aquaculture and fisheries

# SIMILAR NATIVE SPECIES



Photo: Graham Edgar, Australian Marine Life

Irregular seastar  
*Smilasterias irregularis*

### KEY FEATURES:

Five arms with radius up to 6.5cm  
Colour ranges pink/red/brown/grey  
Pointed but no upturned tips

### HABITAT:

Sheltered reef up to 30m depth  
Southern NSW coastline



Photo: David Harasti

Granular/Zig zag seastar  
*Uniophora granifera*

### KEY FEATURES:

Five blunt tipped arms  
Radius up to 12cm  
Orange with purple spines

### HABITAT:

Sheltered reef, silt, seagrass up to 30m depth  
Entire NSW coastline



Photo: www.rling.com

Many-pored seastar  
*Fromia polypora*

### KEY FEATURES:

Five arms with radius up to 11cm  
Bright orange/yellow with black pores

### HABITAT:

Exposed reef up to 160m

REPORT NEW LOCATIONS

See NSW DPI website for up-to-date information [www.dpi.nsw.gov.au](http://www.dpi.nsw.gov.au)

# MARINE PEST FOUND IN AUSTRALIA

## JAPANESE SEAWEED

*Undaria pinnatifida*

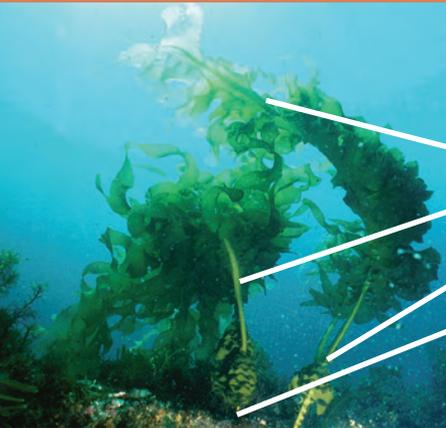


Photo: © CSIRO

- Can grow up to 1-3m tall
- Green-brown fronds
- Leaves stop short of base
- Frilly base
- Holdfast



Photo: © CSIRO

Midrib up to 3cm wide

### KNOWN LOCATIONS:

- Tas and Vic
- Not known to occur in NSW

### HABITAT:

- Sheltered temperate waters
- Intertidal to subtidal zone, usually found between 10-20m depth

### IMPACTS:

- Can be highly invasive and grow rapidly into dense beds
- Overgrows and excludes native algal species

# SIMILAR NATIVE SPECIES



Photo: John Huisman, Marine Plants of Australia

**Cray weed/Strap weed**  
*Phyllospora comosa*

### KEY FEATURES:

- No midrib or base
- Long strand-like fronds with sawtooth edge, air sacks for floats
- Up to 3m tall

### HABITAT:

Exposed rocky reef up to 20m depth



Photo: John Huisman, Marine Plants of Australia

**Common kelp**  
*Ecklonia radiata*

### KEY FEATURES:

- No midrib or base
- Often has spines, brown fronds, up to 2m tall
- Appearance varies with depth (longer, smoother fronds in deep water)

### HABITAT:

Moderately exposed rocky reefs up to 44m depth



Photo: John Huisman, Marine Plants of Australia

**Bull kelp**  
*Durvillaea potatorum*

### KEY FEATURES:

- No midrib or base
- Large bulky fronds
- Up to 8m tall

### HABITAT:

Exposed rocky reef up to 30m depth

**REPORT NEW LOCATIONS**

See NSW DPI website for up-to-date information [www.dpi.nsw.gov.au](http://www.dpi.nsw.gov.au)

# MARINE PEST FOUND IN AUSTRALIA

## ASIAN DATE MUSSEL/BAG MUSSEL

*Musculista senhousia*



Photo: courtesy Northern Territory Government

Smooth fragile shell up to 3cm long, olive green/brown colour

Shell has zigzag markings and iridescent radiating bands

Often in clumps of many individuals



Photo: Graham Edgar, Australian Marine Life

### KNOWN LOCATIONS:

- Found in Vic, SA, Tas and WA
- Not known to occur in NSW

### HABITAT:

- Soft sediment or hard surfaces
- Occurs just below the low tide level in aggregated clumps

### IMPACTS:

- Fouls artificial structures
- Forms dense mats competing with natives for food and space

# SIMILAR NATIVE SPECIES



Photo: Graham Edgar, Australian Marine Life

Blue mussel  
*Mytilus galloprovincialis planulatus*

### KEY FEATURES:

Large fan shaped shell up to 12cm  
Blue/black colour  
Usually found in clumps

### HABITAT:

Sheltered and moderately exposed reefs, pylons and pontoons  
Up to 15m depth



Photo: Graham Edgar, Australian Marine Life

*Brachidontes rostratus*

### KEY FEATURES:

Long flat shell up to 4cm  
Purple colour, regular rounded ribs  
Usually found in dense clumps

### HABITAT:

Exposed rock platforms



Photo: Graham Edgar, Australian Marine Life

Hairy mussel  
*Trichomya hirsuta*

### KEY FEATURES:

Numerous hairs on lower half of shell  
Up to 6cm

### HABITAT:

Exposed reef up to 15m depth  
Common intertidally and subtidally



Photo: Graham Edgar, Australian Marine Life

Little black horse mussel  
*Xenostrobus pulex*

### KEY FEATURES:

Small shiny inflated shell up to 2.5cm in length  
Black colour  
Forms dense clumps

### HABITAT:

Exposed rocky shores  
Mid intertidal zone

REPORT NEW LOCATIONS

See NSW DPI website for up-to-date information [www.dpi.nsw.gov.au](http://www.dpi.nsw.gov.au)



Northern Pacific seastar

### Marine pests can:

- Damage your boat
- Impact on your fishing
- Destroy native habitats
- Threaten human health
- Increase your fuel and maintenance costs

### Help prevent the spread of marine pests!

Check and clean your boat and fishing gear  
before you move

and

**REPORT MARINE PESTS!**

24hr recorded hotline (02) 4916 3877

Email: [aquatic.pests@industry.nsw.gov.au](mailto:aquatic.pests@industry.nsw.gov.au)



Photo by Michael Fiedler