

# Draft Regulation Seahorse Park

## I. COURSE OVERVIEW

Seahorses are unique and fascinating fishes and this diver specialty (Seahorse Diver Specialty) introduces divers to the intriguing biology and behaviour of seahorses. This course integrates the essential recreational diver techniques with searching skills which are embedded in minimising impact on seahorse habitats. This course also includes information on seahorse research and conservation.

The goals of Seahorse Diver Specialty training are:

1. To introduce the diver to seahorse biology, behaviour, habitat and species identification. The course will also provide an overview of seahorse research and conservation issues worldwide, highlighting ways that divers can become involved.
2. To enable the diver to search for seahorses in a safe manner and demonstrate good buoyancy skills, taking account of sensitive benthic substrates.
3. To recognise the importance of seahorse monitoring and provide an opportunity to participate in an international programme of seahorse research and data recording.

## II. COURSE REQUIREMENTS

A. Pre-requisite certification: PADI Open Water Diver or an equivalent rating. The instructor is to ensure that the individual can perform the skills required of an Open Water Diver, concentrating on good buoyancy control skills as these skills are essential to this course.

B. Minimum age requirement: 12

C. Student to Instructor ratio: 6:1, if Divemaster is present this can be increased to 8 students in total in the group.

D. Confined-water training: The course does not include confined water training unless the instructor chooses to use confined water for pre-assessment purposes which may include scuba skills review.

E. Dive data

- The course consists of two open water scuba dives.

- The recommended depth for the scuba dive is 3-15metres. The depth at each dive site will differ depending on the habitat and species of seahorse.

### **III. STUDENT AND INSTRUCTOR EQUIPMENT REQUIREMENTS**

#### A. Student equipment:

- ✓ All personal standard diving equipment including:
- ✓ Mask, snorkel and fins
- ✓ Exposure suit appropriate for local diving conditions
- ✓ Quick-release weight belt or weight system
- ✓ Regulator system with SPG
- ✓ Alternate air source suitable for sharing air with another diver
- ✓ BCD with low pressure inflator
- ✓ Complete instrumentation, including a means to monitor depth, time and direction
- ✓ Recreational Dive Planner (Table or Wheel) or dive computer
- ✓ Diving tool or knife capable of cutting line
- ✓ Slate with pencil
- ✓ Whistle or other signalling device
- ✓ Diver"s logbook

#### B. Instructor equipment:

- ✓ All personal standard equipment listed under item "A" (student equipment)
- ✓ Underwater water camera, (preferably digital)
- ✓ Computer with internet connection
- ✓ Recommended safety equipment. First aid supplies and equipment

#### 5. Course materials:

- ✓ Log Book
- ✓ Student folder
- ✓ Project AWARE brochure
- ✓ Recognition materials
- ✓ PIC envelopes
- ✓ Reference materials, habitat identification photos
- ✓ Seahorse searchers slate

- ✓ Seahorse identification guide, (downloaded from [www.projectseahorse.org](http://www.projectseahorse.org))
- ✓ Copy of seahorse sightings reporting webpage

## **IV. ACADEMIC TOPICS**

### **A. Introduction and course overview**

#### 1. Staff and student introductions

#### 2. Course goals

- ✓ Introduce Seahorses, their biology, behaviour and distribution.
- ✓ Identify major components of different habitat types
- ✓ Teach the student how to identify different species of seahorse
- ✓ Prepare students for the seahorse searching dive
- ✓ Demonstrate active conservation schemes students can participate in.

#### 3. Course overview

- ✓ Classroom; Two theory sessions to be completed, one prior to each of the open water dives
- ✓ b. Open water training; Two open water training dives will be conducted, the aim of the first will be to search for seahorses in locations know to the instructor, taking photographs of seahorses to aid with later species identification. The second dive will comprise of a timed methodical seahorse search taking note of relevant data for later input into the sightings database.

#### 4. Certification

Upon successful completion of the course a PADI Seahorse Diver Speciality certification is awarded. Certification means that you will be qualified to:

- Plan, organise and log open water dives, using the techniques taught on this course, to search for seahorses, in conditions generally comparable to conditions trained in. The student must be aware of the regional differences in seahorse species present and refer to the seahorse identification guide.
- Submit data to the seahorse sightings reporting website, with skills to report species, sex, habitat, numbers and relevant images so that scientists can build up information on seahorse populations worldwide.

#### 5. Class Requirements

- Cost of courses
- Equipment needs
- Attendance requirements

#### 6. Administration (paperwork)

- Standard Safe diving Practices Statement of Understanding
- PADI Medical Statement
- Liability Release and Express Assumptions of Risk form
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### **B. Seahorse Biology and Distribution**

By the end of the session you will be able to:

- Understand seahorse taxonomy and the members of the Syngnathidae family, and know the seahorse species present in the geographic region of the course.
- List typical seahorse habitats for the species in the geographic region of the course
- Describe biological characteristics of seahorses
- Identify the sex of a seahorse
- Understand and state characteristics used to determine species identification
- Identify different kinds of seahorse behaviour
- List important skills needed when diving with seahorses
- Understand how to use the „seahorse searcher“s slate“

**1)** Seahorses are fish and members of the Syngnathidae family which also include pipefish, pipehorses and seadragons. In the Syngnathidae family it is the male broods the eggs.

- Seahorses, have a prehensile tail and head at 90° to the body,
- Pipefish have a straightened trunk, head and tail, which is not prehensile,
- Pipehorses are like straightened out seahorses, they possess an elongated body with a prehensile tail,
- Seadragons have flattened bodies with elaborate leaf like appendages that camouflage them in floating seaweed. The two seadragon species are only found in Australia.

Currently there are 34 recognised species of seahorse; however ongoing research aims to clarify this number. Taxonomy is often complicated in seahorses because they change colour

and grow skin appendages depending on environmental conditions. Confusion can also result from local/common names as they can refer to different species, therefore the scientific names will be used during this course.

**2)** Seahorses are found in both tropical and temperate waters in the north and south hemispheres, geographical range of each species is different; refer to SEAHORSE IDENTIFICATION GUIDE and [www.HIPPOCAMPUSINFO.ORG](http://www.HIPPOCAMPUSINFO.ORG) key to determine species in local area. Seahorses are known to live in many different marine habitats, including coral reefs, macroalgae, mangroves and seagrass beds. In addition some species are found on flat sand and mud, man-made features and also in estuaries and lagoons.

### **3) Life history characteristics**

- Seahorse populations are mostly found in patches at low densities, (one seahorse in 10m<sup>2</sup>. As seahorses are found in groups this means you may find a few seahorses in a small area and then none in the surrounding water).
- Seahorses are site faithful and have a small home range, (they have an area that they live in and don't move great distances).
- Life span is different for each species of seahorse, but generally 1 year for smaller seahorses and 3-5 years for larger species
- Breeding season is shorter in temperate species than for tropical ones
- Most species of seahorse are monogamous (they only have one partner)  
Male pregnancy
- Some seahorses are nocturnal (active at night)
- Seahorses have skin stretched over bony plates, rather than scales, which helps protect them from predation, but turtles, crustacea, water birds and large ocean going fish have been known to eat them
- Seahorses are weak swimmers with a small dorsal fin
- Seahorses use prehensile tails to hold onto substrate
- Seahorses are cryptic and can change colour

**4)** The male seahorse broods young internally a special brood pouch; this brood pouch identifies between the two sexes in all but the pygmy seahorses. Seahorses generally produce 100-300 juveniles in each brood; however pygmy seahorse can produce only 5 and

some larger species can produce 1,500! All seahorses produce few young when compared to other fish of equivalent size.

#### 5) Characteristics for species identification.

- It can be difficult even for the experts so photographs are best so that later more in depth analysis can take place. Photographs will need to focus on the key identification features.
- Using seahorse diagram identify following key features, Coronet, cheek spines, nose spines, (from photo) snout/ head length, ratio trunk length and trunk rings.

#### 6) Behavioural features

- Feeding, head held high and snapping snout
- Holdfast, seahorse holding on to substrate with tail, (predominate posture), orientation.
- Breeding/Courtship, a pair of seahorses holding tails, moving in the water column, maybe changing colour.
- Swimming, using dorsal fin for mobility, vertical.

#### 7) Diving with seahorses

- When you see a seahorse, do not touch it! This damages the protective mucus that is on the seahorse skin that prevents bacterial infections and disease.
- Seahorses are site faithful so you may see the same seahorse in the same location many times.
- Good buoyancy skills are essential in order to avoid contact with benthic substrate and disturbing the seahorses.
- Ensure that you avoid kicking up the sand and silt, which reduces visibility and can damage vulnerable habitats.
- Take photographs to use for identification, try to take different views of each seahorse, including close ups of the head and trunk, and of each side of the seahorse especially if the seahorses is an area that undergoes regular monitoring and if the seahorse is tagged (see population monitoring section).

#### 8) Seahorse Searcher's Slate

- Dive details, accurate location description is especially important, and GPS position is recommended if possible.
- Seahorse details;
  - ✓ Species should be given at time of sighting, and then reassessed with help of photographs and reference literature.
  - ✓ Trunk length should be estimated by holding the „seahorse searcher“s slate“ behind the seahorse, length should be judged to be within four categories, Pygmy (P) <1cm, Small (S) 1-2.5cm, Medium (M) 2.5 - 4cm or Large (L) >4cm.
  - ✓ Depth at which the seahorse is found should also be given.
  - ✓ Holdfast, species level of fauna is not required.
  - ✓ Habitat, use categories as given on slate, Rock >30cm, Rubble 30cm-0.5cm, Sand <0.5cm, Artificial substrates, Seagrass, and Other natural habitats.
  - ✓ Behaviour, use categories detailed above namely; Feeding, Holdfast, Mating or Swimming.
  - ✓ Take photographs of the seahorse, these are vital for species and individual identification. A photograph of the left side, right side, right side head, left side head and an overall image are best. A photograph of the seahorse tag if applicable. Only take the photographs that are possible without moving the seahorse!

*(USE SEAHORSE ID GUIDE AVAILABLE ONLINE AT <http://seahorse.fisheries.ubc.ca/IDguide.html> and key at [www.hippocampusinfo.org](http://www.hippocampusinfo.org).)*

### **C. Seahorse Conservation and Research**

By the end of the session you will be able to:

- Recall current seahorse research topics
- Describe methods of tagging seahorses and on what part of the body a seahorse can be tagged
- List some of the threats to seahorse survival
- Demonstrate an understanding of the international bodies regulating seahorse trade and monitoring threat status
- List the countries that have highest trade in importing and exporting seahorses
- Describe some activities that can be done to help seahorses
- Be competent in filling in seahorse sightings website

### 1. Current research

Many areas of seahorse biology are still unknown; this is highlighted by the IUCN (World Conservation Union) Red List of Threatened Species ([www.redlist.org](http://www.redlist.org)) that categorises most species as Data Deficient with seven as Vulnerable and one Endangered (For June 16th 2008). Current projects on seahorse biology and ecology include assessing fisheries impact on vulnerable populations, distance of adult seahorse movement, connectivity of seahorse populations, basic life history characteristics of seahorses as well as working with seahorse fishers on seahorse conservation and management. Part of this course will teach how to input seahorse observations onto a seahorse sightings website. The aim of the seahorse sightings website is to enable people worldwide to input data on seahorse populations so that scientists can get basic information on distribution and numbers which we currently do not have for most species. For more information on current research see [www.projectseahorse.org](http://www.projectseahorse.org). Some studies tag individual seahorses, photographs of both sides of the seahorse are especially requested in these cases.

### 2. Population monitoring

There are a number of reasons for scientists to monitor seahorse populations, and seahorses have been used successfully to monitoring changes in the marine ecosystem after fishing activities are controlled. Some of these studies have tagged seahorses in order to carry out medium/long term monitoring.

Two main type of visible tag are being used on seahorses in the wild these are, Tag collars and visible implant fluorescent elastomer (VIFE).

Collars, small PVC discs of 3 x 5.5 mm attached around the neck of the seahorse with fine thread, the number on the tag and tag colour is used for individual identification, only used when seahorses are under daily observations in enclosed areas.

VIFE, injected fluorescent polymer, placed under the skin. The colour and position of the tag on the seahorse is used for individual identification, tagging sites include the body and tail.

### 3. Threats to seahorse survival

As with many other fish species, seahorses face threats on many different fronts.

- 1) Direct exploitation, targeted fishing of seahorses for use in traditional medicines, tonic foods, souvenirs and the live ornamental aquarium trade.
- 2) Non-selective fishing gear, as by catch predominantly in prawn/shrimp trawls.



3) Habitat degradation and loss, from fishing gear and anthropogenic changes such as pollution and changes in water quality.

#### 4. League table of trading countries in seahorses

Please note the following facts about the tables

- The league table was collated from CITES information from 2004 and 2006, CITES claims that 2005 data are the most comprehensive.
- Exports and imports from Vietnam, China, Sri Lanka, Indonesia and Hong Kong included seahorse derivative products, (i.e. traditional medicine) for this list we have taken each one to represent one seahorse but suspect this is probably a lot higher.
- The export tables include any seahorses re-exported, i.e. they were not originally caught in the country that submits them for export.
- Imports to Japan were 80% derivative products.
- Imports to USA were 90% live seahorses.

#### 5. CITES

- CITES (Convention on International Trade in Endangered Species of Fauna and Flora) [www.CITES.org](http://www.CITES.org). CITES is an international agreement among 167 governments. Its aim is to ensure that cross-border trade in wild animals and plants does not threaten their survival. The species covered by CITES are listed in three Appendices, according to the degree of protection they need, all seahorse species are listed in Appendix II. This means sustainable trade is allowed, but permits (import and export) are required

#### 6. Ways to help in seahorse conservation

- Observe seahorses in the wild, but don't touch them.
- Think carefully before keeping seahorses in your aquarium: Seahorses are amazing fish but difficult to keep alive and healthy in captivity, they need live food many times a day and easily succumb to disease.
- If your captive seahorse dies, resist the temptation to replace them until you have learned more about their requirements.
- Minimise your use of dried seahorses in traditional medicine. Particularly seek alternatives when choosing a tonic food.
- Read, learn and educate others about seahorses and their habitat.

- Promote the development of marine reserve areas to protect habitats, seahorses and other marine life.
- Use marine resources sustainably.
- Resist purchasing souvenirs when they include dried marine organisms.
- Fill in seahorse sightings reporting website when you see a seahorse
- 7. Competency in completing the seahorse sightings website.

The seahorse sightings website has been set up to collect information from divers worldwide in order to determine a baseline level of seahorse density, and also clarify geographic range. The information collected on the dives should be uploaded with any photographs. This information will be analysed by biologists and will help provide important baseline data on seahorse populations and inform research and management plans.

#### **D. Diving techniques**

By the end of the session you will be able to:

- Be aware of the seabed (e.g. coral, sand, rock) below where you are diving
- Maintain good buoyancy control
- Demonstrate seahorse searching skills
- Record basic information on seahorses sighted

### **V. GENERAL OPEN-WATER CONSIDERATIONS**

A. Involve students in dive planning activities

B. Recommended depth is 3-15metres. The bottom time should not exceed the No Decompression Limit (NDL) outlined on the Recreational Dive Planner (RDP). The majority of seahorse species inhabit shallow depths and dives in which divers spend time in 0.5-5m are likely to be common, if this is the case, this should be explained to the student prior to enrolling on the course.

C. The instructor and staff must be careful to set good examples in their diving techniques to avoid damaging the environment

### **VI. OPEN WATER SESSIONS**

#### **A. Open water-one**

1) Open water Objectives

By the end of this session:

- Demonstrate a controlled entry and descent
- Demonstrate proper buoyancy control
- Identify possible seahorse habitat
- Determine seahorse species identification using noted characteristics and photographs
- Identify sex of seahorse seen, if possible.
- Observe seahorse behaviour and recognise what it indicates
- Maintain safe distance from the seahorse, not touching the seahorse or surrounding habitat is essential.
- Demonstrate appropriate exit techniques

## 2) Briefing

- Evaluation of conditions
- Entry techniques to be used
- Exit technique to be used
- Bottom composition and topography around training site
- Depth range
- Ending tank pressure – when to terminate the dive underwater
- Seahorse searcher's slate,
- Interesting and helpful information on the dive site including other marine life likely to be seen apart from seahorses
- Sequence of training dive- review of dive tasks
  - ✓ Entry
  - ✓ Buoyancy control exercise
  - ✓ Identification of characteristics used to determine species of seahorse, take photos if possible
  - ✓ Record seahorse details on the seahorse searcher's slate
  - ✓ Exit
- j. Special communication underwater, carry slates for recording data.
- k. What to do in an emergency
- l. What to do if separate from buddy
- m. Buddy assignments

### 3) Pre-dive procedures

- Prepare personal equipment
- Calculate NDL
- Don personal diving gear
- Perform buddy check

### 4) Dive Tasks

- Carry out control entry and descent
- Demonstrate good buoyancy by hovering
- Identify suitable habitats for seahorses
- Identify distinctive characteristics used to identify seahorse species
- Take photographs of seahorses seen to attempt species identification
- Record the following
  - ✓ Number of seahorses
  - ✓ Habitat seahorses found, holdfast type
  - ✓ Depth found in
  - ✓ Behaviour, using a hold fast or swimming
  - ✓ Number of divers hours for the dive (The total number of divers looking for seahorses x total dive time spent looking for seahorses)
  - ✓ Time of day seen
  - ✓ Water visibility
  - ✓ Water temperature
- Identify sex of seahorses seen, (maybe from photograph after the dive)
- Observe seahorse behaviour
- Carry out control ascent and exit

### 5) Post dive procedures

- Check in with Divemaster (if appropriate)
- Assist with buddy removal
- Stow personal gear
- Calculate pressure group at the end of the dive

### 6) De briefing

- Positive feedback on students performance
- Problem encountered (if no seahorses are seen, ensure students know this is not detrimental to the certification)
- If seahorses are seen discuss individuals observed and compare data collected on them
- If no seahorse are seen discuss habitat searched and determine possible locations to search in dive two.
- Photographs taken should be analyse to determine species and sex of seahorse
- Arrange for data to be added to the seahorse sightings recording website

7) Log dive (Instructor signs log)

☐ Ideally there is a classroom session between the two dives so that divers can carry out species identification and learn the problems associated with identification keys.

## **B. Open Water-Two**

1) Open Water Objectives

- By the end of this session:
- Demonstrate a controlled entry and descent
- Demonstrate proper buoyancy control
- Identify possible seahorse habitat
- Determine seahorse species identification using noted characteristics and photographs
- Identify sex of seahorse seen
- Maintain safe distance from the seahorse, not touching the seahorse of surrounding habitat is essential.
- Conduct a timed methodical seahorse search in a new area
- Demonstrate appropriate exit techniques

2) Briefing

- Evaluation of conditions
- Entry techniques to be used
- Exit technique to be used
- Bottom composition and topography around training site
- Depth range

- Ending tank pressure – when to terminate the dive underwater
- Seahorse searcher's slate,
- Interesting and helpful information on the dive site including other marine life likely to be seen apart from seahorses
- Sequence of training dive- review of dive tasks:
  - ✓ Entry
  - ✓ Buoyancy control exercise
  - ✓ Identification of characteristics used to determine species of seahorse, take photos if possible
  - ✓ Record seahorse details on seahorse searcher's slate
  - ✓ Exit
- j. Conduct time underwater seahorse search
- k. Special communication underwater, carry slates for recording data.
- l. What to do in an emergency
- m. What to do if separate from buddy
- n. Buddy assignments

### 3) Pre-dive procedures

- Prepare personal equipment
- Calculate NDL
- Don personal diving gear
- Perform buddy check

### 4) Dive Tasks

- Carry out control entry and descent
- Demonstrate good buoyancy by hovering
- Identify suitable habitats for seahorses
- Identify distinctive characteristics used to identify seahorse species
- Take photographs of seahorses seen to attempt species identification
- Record the following:
  - ✓ Number of seahorses
  - ✓ Habitat seahorses found, holdfast type
  - ✓ Depth found in
  - ✓ Behaviour, hold fast or swimming

- ✓ Number of divers hours for the dive (The total number of divers looking for seahorses x total dive time spent looking for seahorses)
- ✓ Time of day seen
- ✓ Water visibility
- ✓ Water temperature
- Identify sex of seahorses seen, probably from photograph after the dive
- Conduct methodical timed seahorse search on new habitat
- Carry out control ascent and exit

#### 5) Post dive procedures

- Check in with Divemaster (if appropriate)
- Assist with buddy removal
- Stow personal gear
- Calculate pressure group at the end of the dive

#### 6) De briefing

- Positive feedback on students performance
- Problem encountered (if no seahorses are seen, insure students know this is not a problem)
- If seahorse seen discuss individuals seen and compare data collected on them
- If no seahorse seen discuss habitat searched and determine possible locations to search in dive two.
- Arrange for data to be added to the seahorse recording website

#### 7) Log dive (Instructor signs log)