DIVERS & SCIENTISTS´ NIKON D500 CAMERA AND PHOTOGRAPHY GUIDE

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AND PHOTOGRAPHY GUIDE

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INTRODUCTION

This guide is aimed at those who are beginners and more experienced in photography and have access to a Nikon D500 or other Nikon cameras and want a concise **complement** to **Nikon's D500 manual (**401 pages in printed version). Most similar Nikon models are often built according to the same principles and functions and the settings do not differ significantly. Many of the practical photography tips and reviews of photographic concepts given here are of a general nature, regardless of which camera you use.

Our main focus here is to make you comfortable with a Nikon camera and be able to quickly change to optimal settings for each shooting situation. We focus especially on the Nikon D500 which is really a high-quality half-frame camera that you can buy second hand at a reasonable price because the production has ended. We prefer the D500 to the D7500 that is produced today since some practical features are missing in D7500. D500 is great for wildlife photography, and both half- and full-frame lenses can be used.

The D500 is an advanced camera with **many adjustment options,** which can be perceived as problematic at first. We therefore systematically go through all the camera's buttons, controls and menus and show the **default settings** that we prefer as well as a **checklist** for these. It's handy to have and remember your default settings as you can make the necessary changes faster in different shooting situations. We briefly go through concepts such as image quality, depth of field, exposure time, aperture, ISO, white balance (WB) and how they affect your photography. We give some general tips and a checklist of what you should bring with you when you go out taking photographs and suggestions for **telephoto, macro** and **underwater photography**. All of our menu settings are given at the end of the Guide.

Note that some of the advice/choices we give here are worth discussing, not least because photo situations and your own goals can be so different. Last, but not least, it is only through diligent photography and analysis of the photos taken that you can develop as a photographer.

IMPORTANT

Protect the camera from **serious damage**: turn the **camera off** before **removing the lens, battery, memory card** and **flash.**

Replace the battery when less than **half** of the capacity is left (the rest may disappear quickly).

Have either **auto** or **manual focus** on **both** lens and body.

Lock the **telephoto lens zoom** when **transporting.**

Make sure that the lenses are **clean at all times** and use a rain cover for the camera and lenses if necessary (e.g. when shooting from a small boat or in bad weather).

BUTTONS AND CONTROLS

The right and left of the camera are indicated from the **"photographer" side.** "Front " is often closest to the lens and "rear" is closest to the photographer. The **small monitor** (control panel) is the one on the top right side and **the large monitor** is the one on the back**.** Different **settings** in the camera are made with three **different** spin selectors**, two of which are shown** in **(fig. 1)** and **selections** in the **menu** are made with the **multi selector** (see below). **Details** about different **options** are given under **Settings**. If **the camera** is **ON** but nothing happens, one should first change the battery (after turning off the camera) and then press the shutter button. If **Error flashes** in the small monitor, you can first change the **battery** and if that doesn't help, seek help in Nikon's camera manual. Sometimes the Error message can disappear if you press the **shutter button.**

Fig. 1. The rear and front spin selectors as well as the small monitor (referred to as the control panel in the Nikon manuals). The left spin selector is to the left of the flash shoe (not shown here).

Left front

Lock button for the lens. Large black press-button under the white lens connection point. Hold the camera down and match the white point of the lens to the white lens point of the camera, then rotate the lens counterclockwise and the lens locks. Rotate the lens clockwise with the lock button pressed down to remove the lens. Make the movements quickly and in a controlled manner to avoid dust entering the camera.

Focus lever for auto (AF) or **manual (M) focus**. The lever is underneath the lens lock button. Select the same setting on the lens (M/A or M).

The knobbly button inside the focus lever. Press the button to select different **Autofocus modes and focus points** (see below).

Right front

PV button. To check the depth of field (great for macro photography with a shallow depth of field).

Fn1 button. Not necessarily used, but can be assigned functions.

Front spin selector. Behind the on/off switch for e.g**.** aperture selection, focus points, etc. (see below).

Left top

Left spin selector. To the **left of the flash foot** and used for various selections **(**e.g. if one or more photos are to be taken consecutively, etc., see below). To **turn the left spin selector, you have to hold down** the **small black button** right in front of the spin selector.

Above the left spin selector are four press buttons. **WB (**white balance**), MODE** (automatic and manual aperture and time setting), **EXPOSURE MODE** (with four white corners, selection of areas for camera metering and exposure suggestions: matrix**,** centre-weighted**,** two different spot metering**)** and **QUAL** (where the image quality is set**: JPEG**, **TIFF or RAW**, which can also be set in the menu displayed in the large monitor (see below). When the buttons are pressed, selections are made using the front and rear spin selectors on the right front and right back (see below).

Flash shoe

The Nikon D500 does not have a built-in flash, which is why you should supplement with a custom external flash, for example the **Nikon Speedlight SB-900**. Of course, the camera supports **TTL** (through the lens), which is equivalent to full auto flash.

Right top

Calibration of the viewfinder. Button with **+/- arrow** to the right of the flash foot, to calibrate for personal view.

Off-On lever with shutter button. To turn the camera on and off, as well as LED illumination of buttons. The shutter button has an autofocus function which is preferable in certain situations, such as underwater shooting to reduce the number of buttons to reach. We also have autofocus when pressing the AF-ON button. Which one you prefer is a matter of taste and it should be tried out in different photo situations (see below**, Settings/Right Back/AF-ON**).

Red dot button. Video on and off.

ISO button. This is where you set the ISO values.

+- button with green dot. Exposure compensation so that you can overexpose or underexpose in relation to the camera's suggested values.

Left back

Arrow button. Displays captured images or recorded video sequence in the large monitor.

Trash button. Deletes images and videos (can also be done in the Menu).

Menu button. Shows different menus and settings made (using the multi selector on the right back, see below).

Key. We mostly use this to protect important photos from accidental deletion. Also used for Picture Control, when no photos are displayed in the large monitor, see below.

+ and - buttons. Enlarges and reduces images in the large monitor.

OK button. Necessary for some **important ok decisions** (otherwise the middle button in the multi selector to the right of the monitor is used as the ok button).

Fn2. Not necessarily used, but can be assigned functions.

Right back

The AF-ON button is located directly below the small monitor. Press it to autofocus. **VERY GOOD.**

The secondary selector. Small knobbly selector under the AF-ON button that can be assigned to autofocus functions via the menu (rarely either practical or necessary).

Rear spin selector. To the right of AF-ON for **selections** such as exposure time, Autofocus mode, etc.

Multi selector. Large round selector to the right of the large monitor. It has small dark **arrow selectors** that are used, for example, to navigate through various menus displayed in the monitor and to scroll between captured photos (arrow left/right) and display **photo data** (arrow up/down). The small button in the middle is the **ok button** we use the most. There is a lock lever around the multi selector with a **white dot** that must be **selected** to so we can **move** focus points (using the multi selector) to a **specific** area of the frame **(**e.g. to the **centre** which is **our choice**) and **L** locks the selection, which should be selected as the **default. IMPORTANT.**

Two different **info buttons** under the multi selector. The *i* button is used for personal rating of captured photos etc. and ***Info*** gives the camera's exposure time, aperture and WB info **in real time** etc. in the **large monitor**. Provides a quick overview. **VERY GOOD**

LV button with a **lever** at the bottom**. Press the button** to activate **the large monitor** and the lever selects either **camera** or **video**. We have **video** as the default setting as we rarely use the monitor for photography. We also get one less setting to think about if we want to quickly move on to video (see video below).

Wire Release

We sometimes use a manual Hähnel CAFC (remote shutter release) for tripod photography. It connects to the 10-pin accessory connector (white dot at the rubber cover above the lens lock button). Note that autofocus cannot be controlled via this if autofocus is selected for AF-ON only. If you select **Shutter/AF-ON** (i.e. both options for autofocus) in *Menu > Pen > a Autofocus > a8 AF activation*, both focus and trigger can be controlled via cable. Wireless remote controls are also available.

PREFERENCES

Below we mainly show our **default settings** that provide good flexibility. If you remember your default settings, it is **faster** and easier to **change them** when needed. Often you have to be able to quickly change settings in the camera. One should therefore **practice in advance** for various potential changes to shooting situations (e.g. changing shutter speed, aperture value and WB A to e.g. the cloud option).

Left front

Focus settings

Manual or **autofocus**. To be selected using the **focus lever** below the lens-lock button. **IMPORTANT:** always have **the same** setting on both camera and lens. We have **autofocus** as the **default setting**.

Use the knobbly **button** inside **the focus lever** (right front) and the rear and front spin selectors to make different **autofocus settings.**

Autofocus mode in the viewfinder and in the small monitor. **Mode** means whether the camera should focus on stationary or moving objects. Press the **knobbly button** inside the focus lever and use **the rear** spin selector to select **AF-S** (stationary) or **AF-C** (moving object) focus mode. We have **AF-C** as the **default setting**. First, however, you have to make sure that there are no restrictions in the menu. ***Menu*** *> Pen > a Autofocus > a10 No restrictions > select all options* (now in --).

Autofocus area mode in the **viewfinder.** Selection of different **Dynamic AF areas in AF-C.** These are areas with different **numbers** and **distribution of** dynamic focus points (25 to 153 points visible in the viewfinder) that together **help the** camera focus by taking into account all or different parts of the object. We have more options in AF-C as moving objects must be taken into account. Press the **knobbly button** within the focus lever (left front) and turn **the front** spin selector (right front) to select **d 25** as **default setting**. If you want to use other areas, you can choose, for example: **D 153** (a wide area for **unpredictable movements** of objects). The **3D option** can be a great way to focus on a moving object, such as a flying bird. Take test shoots and compare with AF-ON.

When selecting **AF-S (**stationary object) you have only two dynamic AF areas to choose from (Group and Auto). If you select only a **single focus point** (**S)** in **AF-C or AF-S,** it is not

dynamic as it cannot be compared to the focus of other points. **Focus** in a **single point (S)** can have clear **advantages** in many situations (e.g. when you do not want the object's surroundings to be part of the focusing process, see below).

NOTE that in the lower part of the **viewfinder** (as well as in the small monitor), **AF-S or AF-C** and the **number** and position of focus points are displayed only when the **knobbly button** inside the focus lever is **pressed. VERY GOOD**

Autofocus mode in **the large monitor.** We use the monitor mainly for **video filming** (and where it is mandatory). Turn on the large monitor (LV **button** at the bottom **right** of the monitor). Press the knobbly **button** in **the focus switch** under the lens lock on the left front of the camera, and use **the rear** and **front spin selectors** to select **AF-F** (moving object) and focus points **NORM** (for video) as **the default setting. Note** that the autofocus mode **for moving** objects is called **AF-F** in the large monitor. A **yellow text** in the upper part of the large **monitor** shows the selections made when **the knobbly button** inside the focus lever is pressed.

Note that the camera focuses **automatically and continuously** in **the large monitor,** but the focusing is often **slow**. You can quickly focus by pressing the **AF-ON** button **before** starting a video recording in the monitor and **while** filming. Note that the focusing motor is built into the lens and may be slow on older lenses. Nikon lenses should be marked with AF-S **or** AF-P **(P** means that the lens is specially adapted for video).

Right front

PV button. To review how different aperture settings affect depth of field (useful in macro photography).

Fn1 button. **We don't use this button** very often, but it can be assigned different functions (e.g. spot metering, which can be convenient if you have selected Matrix or Centre-Weighted Area as the default setting. ***Menu*** *> Pen > f Lever > f10 Assigning MB-D17 Buttons > Fn Button > Spot Metering.* When the **Fn1 button** is pressed, the **spot icon appears in the viewfinder** and the small and large monitor. This saves you time if you're in a hurry!

Front spin selector in front of the OFF/ON button. For the selection of e.g. **aperture values**, auto or manual ISO and dynamic AF ranges).

Left top

SHUTTER CHOICE. Press down the **small black** button **behind** the **QUAL** button and at the same time rotate the **Left Spin Selector (**left of the flash foot) to select from the shutter options on the Left Spin Selector: **S (one image); CL** (low); **CH** (high); **Q, 1** image (silent); **QC 3** shots/second (silent); **Self-timer**; **MUP** (mirror up that reduces mirror vibration in macro and telephoto but often not necessary).

First, however, we need to select the number of shots that can be taken at a shutter depress for **CL** (low) and **CH (**high) in the ***Menu*** *> Pen >* d Shooting/Display > *a1 (select 3 shots per second* **> a2** (*select **30 frames*** per shutter press)**.** We then choose **CH (30)** as **default setting** since we often want sharp images of e.g. a **flying bird.** For stationary objects we can change to **CL (3)** but it is **ok to keep CH (30)** and release the shutter button after a number of shots.

WB (white balance). WB is a process of adjusting colours in a way that compensates for the colour of the light source (such as a yellowish light from a lamp) so that colours in the photo are as natural as possible. Press the button down and select **WB A** (auto) as the **default setting** using **the rear spin selector**. WB is a function that **often** needs to be **changed**, e.g. during cloudy days and when a flash is used. **TEST (**in **Mode M**) the effects of different WB settings **live in the monitor** (settings are shown in yellow). This is especially important when using **artificial light** such as flash with a known colour temperature. We have **5560 degrees** as the **default setting** for our MF18 macro flash. Kelvin degrees can be set in: ***Menu*** > *Camera* > *White balance* > *K* > *select colour temperature.* **Note** that you can also adjust for colour here. Here you can also save other ISO settings (e.g. from taken photos in the camera's memory card by selecting **PRE** > *blank frame* > *ok* > select image > give the image a name that is then visible in the large monitor. This can be useful if you want to restore historical settings for new photos using the same light sources that were used earlier. All of these new selections are now available in the Menu. Note that in most cases, fine adjustments of colour can be made in editing software, which is often needed to adjust captured photos anyway. An alternative to setting Kelvin degrees when using a flash is to select the flash option in ***Menu*** **>** *Camera* > *White Balance* > *Flash* > select compensation in the colour graphics that appear if you right-click in the multi selector (to the right of the large monitor). We usually prefer to set the optimal **Kelvin degree**.

MODE (M, P, S and A programs for handling aperture and time). Press the button down and use **the rear** spin selector; **M** (**manual time and aperture); P** (exposure time and aperture are selected automatically); **S** (**select exposure time** and aperture is selected automatically; **A** (**select aperture, f-value,** and time is selected automatically). We use **P** as the **default setting** and **Auto ISO,** see below, which allows us to quickly photograph **unexpected objects** in the field. Once we have decided in the field what we want to photograph, we change to **Mode S, A or M** depending on the situation. **The exposure time** is selected using the **rear spin selector** and the **aperture** is selected using **the front spin selector**. In the case of fast moving objects (flying birds), we switch **to MODE S** and set the time to e.g. **1/4000** second and then we get aperture and ISO automatically (see photo tips below).

EXPOSURE MODE (button with four white corners, to the left of the flash foot). We will now **choose one area** (out of four**)** for the **camera's** measurement **of light that affect** the camera's **exposure suggestion. Note** that the icons for different modes look different in the viewfinder and in the small monitor. We prefer to look in the viewfinder where icons are more visible. Press the exposure mode button and select the exposure area using the rear spin selector**: Matrix** measures **the entire image** (icon: white dot surrounded by heavy black ring and white corners); **Centre-weighted** measures **more in the centre** but throughout the image (**icon**: white dot surrounded by two white semicircles and black corners); **Spot** measures in the middle of the image **(icon:** small white dot in black box**)** and **Spot*** with compensation for e.g. a bright studio lamp **(icon:** as a spot but with a star). The selected exposure function is also shown in **yellow** in **the monitor.** We have regular **Spot** as the **default setting.**

Right top

Calibration of the viewfinder. +- button to the right of the flash foot (to calibrate for personal vision). **Pull out** the knob and **turn** until the thin four lines in the corners of the viewfinder become sharp and **press** the button). **IMPORTANT.**

Red dot. Video Off - On. Red dot lights up in the monitor while recording.

OFF-ON lever with shutter button. If the lever is turned to **the white bulb**, LCD lighting for buttons on the back of the camera and the small monitor will turned on. To be used in the dark and our **default setting** is **ON:** ***Menu*** *> Pen > d Shooting/Display > d9 LCD illumination > ON*.

ISO button. ISO is a measure of a camera´s sensitivity to light. A high ISO will result in higher sensitivity to light and reduced time for exposure. The button is pressed and with the **front** spin selector you have two options, **Auto ISO (default setting**) or ISO. Both Auto ISO and manual ISO **must be** assigned an **ISO value.** With **the rear** spin selector, we select for AUTO ISO a value of **2500** and for Manual ISO we choose **100. NOTE:** ISO values can also be set in: ***Menu*** *> Camera > Settings for ISO sensitivity.* In AUTO ISO shooting, the camera selects an ISO value between 100 and 2500 which can be seen in the captured photo in the large monitor. Auto ISO max value is important when shutter speed and aperture have reached maximum acceptable values and a high ISO can then "save" the image. You should also try higher ISO values >2500 to get a feel for how far you can go in different shooting situations. **VERY GOOD.**

Exposure compensation (**+- button** to the right of the ISO button). Here you adjust the negative effects of the camera's light metering (which can be fooled by the prevailing light conditions) or if you want to create a certain light effect**.** Press the button down and select the desired compensation using the **Rear Spin Selector. Positive** values brighten the images. The **default setting** is +-zero. Numbers are visible in both the small and the large monitor and indicated in the viewer. Works best for **spot** and **centre metering**. Can also compensate a flash exposure value**. VERY GOOD.**

Left back

Arrow next to the trash button**.** Displays **captured images** that can **be inspected** in the large monitor. Exposure time, aperture value, ISO, lens used, etc. are displayed by pressing the **arrow up** and **down** in the multi selector (to the right of the monitor) and with the left and right arrows you scroll back and forth through the images.

Trash button. Photos are deleted by clicking the **trash button**. Images can also be deleted in: ***Menu*** *> Arrow > Delete* (all or selected). **NOTE** that **deletion in the Menu** must be completed with **the OK** button on the **left back**.

MENU button. Here you can make all the basic settings and **allow** or **block** different options given on the camera's buttons. **See all our menu settings at the end of the guide.**

Question mark/Key button. We use this feature to **protect important photos** in the large monitor from **accidental** deletion**.** The key icon will then appear in the photo in the large monitor. If all photos are selected for deletion, only the protected ones remain. Pressing the Key button when no photo is displayed in the large monitor **will open *Image Control*** in ***Menu*** > Camera. Select **Standard (SD)** as the **default setting** and keep all adjustments at +- zero (if processing of raw images is desired later).

The plus and minus buttons change magnification (good for **focus check** of **captured images** and **live** in the **monitor)** and **more captured images** can be seen at the **same time** in the monitor if you reduce an image. When magnified, you can move within the image with all the arrows of the multi selector.

OK button. Must be used when **deleting** images via the menu**.**

Fn2. Can be assigned multiple functions, but not necessary.

Right back

AF-ON (autofocus button). We have chosen to have autofocus on **both AF-ON** and **Shutter-Half-Depressed (default setting):** ***Menu*** *> Pen > a Autofocus > a8 AF Activation > Shutter/AF-ON > OK (*now ON is shown in A8 AF activation). In an underwater case, it is usually only autofocus on the shutter button that applies, but when photographing flying birds (using **AF-C**), we use **AF-ON**. Half down shutter release also focuses when it is **fully depressed even with e.g. C_H30 setting**. How you choose to autofocus is a personal choice. **VERY GOOD.**

With the **AF-S** setting, both the **shutter** button **half-pressed** and **AF-ON** will lock the focus at one point (and **this** focus is retained when moving the **camera**). Good if you want to have a person in focus who is outside the centre of the picture. **VERY GOOD.**

You can **also choose** to have an autofocus function in **the Secondary selector** (small knobbly selector under AF-ON). We have chosen **not to have autofocus in the secondary** selector as it can be difficult to press the secondary selector for autofocusing without accessing up/down and right/left, which can cause problems (almost impossible if you have gloves). The advantage of having autofocus also in the Secondary selector is that you can have a number of focus points that differ from those in **AF-ON** and **shutter button.** However, we do not see any great benefit from this for our own part.

Rear spin selector. To the right of AF-ON for **selecting** e.g. **exposure time**, autofocus mode.

The multi selector is the large round selector to the right of the large monitor with small arrow selectors that are used for example to **navigate various menus** displayed in the large monitor and to scroll between captured **photos** (arrow left/right) and display photo data (arrow up/down).

Focus lever of the multi-selector. This is used to **move the focus points** (easiest in the **viewfinder**) i.e. if you want them to focus **centrally or outside** the centre**. Activate** the camera with the s**hutter** button and use the **multi selector arrows** to **move the focus points,** but **first** the lock control must be opened (turn the lever to the **white point**) and when the **setting** is **completed**, lock their position (turn the lever back to **L, which must be your default setting**.

i **button.** Can be used together with the multi selector to **rate** photos, for example. We rarely use this.

Info **button**. Displays current settings in **the large monitor** in **real time**. If **the monitor** is turned on with the **L_V** button, you can press the info button several times for different information. For **camera setting** on Lv lever are e.g. aperture, time, ISO, WB shown (+- exposure correction is always visible on the right side). With **video setting** on Lv, some other information is displayed, such as possible recording time and some video settings. **Note** that

even when the **shutter button is pressed,** some real-time values are displayed in the viewfinder.

Lv button. To open the large monitor.

Lv lever. To select **the camera** or **video recording.** We have **video** as the **default setting.**

Summary

It is easy to **forget** all the differences between the focus and exposure settings after a long break.

1. Autofocus settings: are made with **the knobbly button** inside the focus lever on the **left front** and the **rear** spin selector to select the **AF-S** (still object), **AF-C or AF-F** (moving objects in the viewfinder or large monitor, respectively) and the **front** spin selector to select the number and distribution of dynamic **focus points** (e.g**. D25** in the viewfinder and e.g. **NORM** in the monitor. Note: different focus point settings in the viewfinder and the monitor.

Moving and locking the focus points (in the **viewfinder**) to a selected part of the frame, usually in **the middle**, is done by activating the camera with the shutter button and use the **multi selector arrows** to **move the focus points,** but **first,** turn the multi selector lever to the **white point** and when the **setting** is **completed**, lock the position by turning the lever back to **L** which **must** be the **default setting**. **IMPORTANT**

2. Exposure mode settings: Use the **exposure button** with four white corners, to the left of the flash foot. Select an **area** for the camera's metering of light that affect the camera's exposure suggestion. **Press the button** and select your area with **the rear** spin selector and the selection is visible in the viewfinder (small icons in the bottom left) and in yellow in the large monitor and in the small monitor (hard to see). You can choose from **four** different **measurement areas** in the image: **Matrix, Centre-weighted, Spot metering** or **Spot metering** with **compensation for bright areas (**e.g. headlights).

All camera automatic exposure suggestions are made in relation to the set area for light measurement (e.g. Spot) and the exposure **MODE: P** (no limitations), **S** (you choose the **time)**, **A** (you choose **aperture,** f-value) and **M (**you choose both **time and aperture).** The **ISO** setting affects exposure metering suggestions for time and aperture. You can choose either a specific ISO value or Auto ISO which varies between the specific ISO value and a selected maximum value (in the menu). In **Mode P**, the camera tries to optimize time and aperture and then selects an Auto ISO value or takes the manual ISO value if it is pre-selected. Extremely high ISO values will result in blur and pixels will be visible when magnified, so we limit ISO auto to 2500. However, test higher ISO values (see ISO below, in **GENERAL INFORMATION ABOUT PHOTOGRAPHY.**

Exposure mode (button with four white corners, to the left of the flash foot) should be selected depending on the **shooting situation** (see photo tips below). **Note** that Mode **P does not allow** you to manually influence time and aperture and we use P mostly as **a default setting** to quickly photograph unforeseen objects and to check the lighting conditions in a taken photo (the info button also gives exposure suggestions in real time including ISO value). **Then** we **choose** either **S**, **A** or **M** when we have decided what we want to photograph. The beauty of a few default settings, which we **remember**, is that we know we have to consider these when choosing an object. **With Exposure Compensation** (**+-** button to the right of the ISO button) we can adjust the exposure process so that we get a brighter or darker image.

Quick check of default settings for buttons and controls

Lenses

VR lenses: **OFF** (ON when long shooting time, longer than 1/1000 sec, and no tripod),
Autofocus: **ON (**MA)
Telephoto lenses when transported: **on lock**

Camera

Left front

Focus lever: set at **autofocus** (**AF)**

Viewfinder AF mode: **AF-C, d 25** (press knobbly button inside the focus lever)

Focus points centred in the viewfinder and locked (**L**) Multi selector lever

Monitor AF mode: **AF-F** and **NORM** (in yellow, open monitor and press knobbly button inside the focus lever)

Left top

Shutter Selection: **CH (30)**

WB: **A** (auto, 0.0 in the small monitor)

MODE: **P (**in the small monitor)

Exposure button**: spot** (in the viewfinder)

Right top

ISO: **Auto ISO** on **(max 2500** and **min 100)**. **CHECK**: in the small monitor AUTO ISO 100 and see the **max value of 2500 in:** ***Menu*** *> Camera > ISO sensitivity settings > ISO: 100; automatic ISO: ON; highest sensitivity: 2500, Highest Flash ISO: 250; Longest shutter: Auto*

Exposure compensation: **+- zero** (in the viewfinder and the small monitor).

Left back

MENU button: Most settings don't change very often. Check the camera's date and time in: ***Menu*** *> Wrench > Time Zone & Date>Date & Time*

Question mark/Key: Image control: **SD** (**default)**

Right back

Autofocus: both in **AF-ON** and **the shutter**

Locked (**L**) Multi selector lever

LV: **on video**

GENERAL INFORMATION ABOUT PHOTOGRAPHY

Photography is about the art of **capturing light** with a camera and a good image should have a well-thought-out motif, optimal light, depth of field, shape, colour rendering and a good composition. This can be accomplished in many different ways depending on the purpose of the photo. A scientific photo documentation has its specific requirements for e.g. precise scales so that distances can be measured and that colours and shape are realistic and sometimes that photos are taken in a standardized way to facilitate comparisons between photos. Other types of photos may convey emotions, which is probably the most demanding and inspiring part of photography. For any type of photo you want to take, it's important **to first** have an **idea** of what you want to accomplish. Below, we'll go through some points worth reflecting on. This is purely intended as a **brief introduction** to photography for the beginner and online there are very good photography tips and explanations of photographic terms.

Image quality

The choice of format in which the photo is saved is absolutely central when it comes to photography as the image quality is affected depending on the choice you make. However, all formats have their pros and cons. In ***Menu*** > *Camera* > *Image Quality,* we can choose between different formats: **JPEG, RAW** and **TIFF.** This can also be done with **the QUAL button** on the left top

JPEG compresses information in the photo, which can make it difficult to "save" an image in a photo editing program without losing information. JPEG takes up less space in the camera and computer and more pictures can therefore be sent together in an email. However, we do not see any major photographic advantages **in taking photos** only in JPEG and lack of space in the computer is not a problem today when shooting in TIFF or RAW. We take all our photos in **TIFF** size **5568*3712** or **NEF** (**RAW L**) in to get good information in the image and do the processing of photos quickly and easily in Photoshop. This usually provides very good images that can be published and the opportunity to create an image size that is adapted for the purpose in the best possible way. TIFF provides uncompressed RGB images in 24-bit colour (8 bits per channel) and is supported by a wide variety of imaging software and is often considered optimal for saving processed photos from other formats including RAW. There is some processing (e.g. white balance and colour) in the camera with the TIFF setting, which makes TIFF images about twice the size of RAW images. We always save the original photo unprocessed and work with a copy in Adobe Photoshop. If we want to send images to someone who does not need to enlarge or process the images themselves, we send the processed ones as JPEGs. The next step is to shoot **in RAW** which saves **all** information unprocessed and processing is done in e.g. Adobe Photoshop, Adobe Lightroom or RawTherapee but do not be in too much of a hurry with this if you are a beginner. Spend some time to get to know your camera and test it in different shooting situations. TIFF or RAW is often discussed among photographers and our conclusion is that TIFF is the best choice for those who do not want to immerse themselves in and sacrifice time on more advanced image processing but still get nice photos. RAW images can be enhanced slightly more than TIFF images, which is why many professional photographers often prefer RAW.

Light, colour, sharpness/blur, and depth of field

The light and colour in an image is affected by **the actual** light when shooting, and it is the shutter **speed** and **apertures** that physically capture the light, and **ISO** setting, **WB** and **exposure compensation** then take part in the process.

Exposure time affects the **ligh**t, **sharpness**, **colour** and **contrast** of the image. For example, a short time gives a sharp image of a bird's wingbeats, and a long time creates a blurred image of something moving (e.g. rushing water), which creates a movement drama in the image. The slower the shutter speed, the more colour and contrast you get. With a wire or remote shutter release and tripod, you can get extremely long times without the camera moving when the picture is taken. **The lens VR** should be used when holding the camera and you have long times (longer than 1/1000 of a second). **VR corrects** for **camera movement, not object movement,** and does not work optimally at fast shutter speeds. VR is not needed when using a tripod.

The aperture affects the amount of light that enters the camera. Aperture is given as f/1.4, f/2 etc and normally up to f/22. **Low f-numbers represent** a high aperture, i.e**. a large opening,** which gives a large light transmission and a bright image. **High f-numbers** such as f/22 represent a low aperture, i.e. a **small opening** with little light and a **dark** image. Think of this as fractions and it makes sense that a high number like 22 equals a small aperture.

Aperture **also affects the depth of field**, which is an important component of your image. The smaller aperture (larger f-number), the greater the depth of field we get, but then the image becomes darker because we get less light. To increase the light in the image, we can increase the exposure time, ISO and/or the exposure compensation. Depth of field is also affected by the distance to the object. The closer, the shallower the depth of field. This can be accomplished by physically approaching the object or zooming in on the object or switching to a lens with a larger focal length. **Note** that it is the object's proportion of the image area that determines the depth of field and not the focal length itself. The depth of field is the same for different focal lengths as long as the object's proportion of the image area is equal.

In **Mode A**, we set our **desired aperture** and the camera selects the time. When **depth of field** is important to the perception of a photo, Mode A is often chosen to determine the aperture first. An advantage of a tripod is that you can increase the time, have low aperture (high f-numbers) and avoid high ISO values.

In **Mode S,** we select the appropriate shutter speed and **then the camera** selects the **f-value**. This is suitable when you have to prioritize a very **fast** shutter speed (e.g. a flying bird) **or** a **slow** shutter speed **(e.g. evening or night photos** and **rushing water** that should be **blurred).** An **ISO** setting at Auto ISO will then be used increase the ISO when needed.

In **Mode M** you set both the time and the **aperture**, but then you should have time to test in advance that you get the desired exposure (using the exposure compensation and ISO settings). This has the advantage that you can check that the ISO value is acceptable and you have full control over the effect of your settings. With **f-8 (sweet spot), acceptable time, ISO 100** and **tripod** (if possible) is often an optimal solution for good images of still objects. Generally speaking, you choose low f-numbers for portraits (shallow depth of field) and high f-numbers (11-22) for landscape shots (if you want sharpness in the entire image). When using flash and when you need the same exposure settings for multiple objects (e.g. scientific photos), it is a good idea to use **Mode M.**

ISO is a camera setting that increases or decreases the camera's sensitivity to light .The higher the ISO, the brighter the image and shorter exposure time. If you're shooting a dark object (or moving object with a fast shutter speed), increasing the ISO (e.g. in Auto ISO) can allow for greater flexibility in terms of exposure time and aperture. The price you pay for high ISO values is increased blur/noise in the images. For stationary objects, it is advantageous to select **ISO manually**. An ISO value of 100 provides optimal resolution. But the sensor is so good that you can usually easily go up to ISO values of over ISO 2500 without much impact on the quality of the image when enlarging / cropping. However, you should **strive for low ISO values** and you should first choose shutter speed and aperture (f-value) and then only raise the ISO value if necessary. If the ISO level has reached a maximum limit of what you can accept, you may be forced to increase the aperture (lower f-value) i.e. compromise the depth of field and/or increase the time. **Note** that you almost always get a better picture by increasing the ISO in the camera compared to increasing the light in e.g. Photoshop.

WB (white balance) compensates for the colour of the light source so that colours in the photo are as natural as possible. There are different settings for ISO that compensates for variations in natural light (e.g., cloudy day, direct sunlight, shadow) and use of a flash.

Aberration and diffraction. A lens consists of a number of lenses that can cause **aberration** that occurs if the light in a lens converges at different points which **affects sharpness and colour reproduction**, but this can be partially remedied with a smaller aperture. **Diffraction** occurs when you have a small aperture (e.g. f/22) and is caused by a proportionally larger portion of the light passing the edge of the aperture and that part of the light changing direction, leading **to blur.** An **f-value** of around **5.6 - 8** gives the least aberration and diffraction with most lenses and this is called a lens's "**sweet spot". Note** that the **quality** of the **lens** is a crucial factor for image sharpness and colour reproduction when all settings have been made optimally.

Image's light histogram

The histogram is displayed by opening the image in the large monitor and pressing the up arrow in the multi selector until the histogram appears. The histogram is only a guide that illustrates the **overall** light in the image. The histogram shifts to the left if the object is dark and to the right if it is light. If the object is evenly lit, the histogram will be evenly distributed. The histogram **does not have** to be evenly **distributed**, and the optimal distribution depends on the object (e.g., a sunset). A positive **exposure compensation** brightens the image. You can also use **active D-lighting** for **high-contrast objects** (corrects shadows and bright areas). ***Menu*** > *Camera > Active D-lighting (***OFF** as the **default setting)**. **It is rare that we use the histogram.**

Composition and balance

How you compose your image, i.e. where different elements in the image are placed, is crucial for how the image is perceived. **The purpose of** the image therefore becomes the most important factor in the composition of the image and all the **different sub-components** must have a purpose and disturbing components must be avoided when photographing or when cropping (if possible). A grid in the viewfinder can often help you get the horizon and composition right. This can be a default setting if you like it: **Menu** > *Pen > d Shooting/Viewing > d8 Viewfinder Grid > ON.*

Composition can be influenced by lens selection, depth of field, distance, focal length (zooming), camera position (from the side, from above, from below) and by avoiding meaningless and bland components. The balance, i.e. the surface ratio between different elements in the image, is important. Balance here can be both balanced and unbalanced. The balanced image gives the impression of calm and the unbalanced conveys drama and dynamism. Note that a seemingly empty space in the vicinity of the main object does not have to be meaningless as it can contribute to a feeling of emptiness in the image that can sometimes be important by reinforcing the main object's "loneliness". Don't let your main object stand at the edge of the image, but a component that enhances the feel of the image may well stand at the edge. Finally, use lines in the image to guide the viewer's gaze. It can be a road, wall or shoreline that accentuates the object and strengthens the feeling you want to achieve. Depth of field is an important part of composition as a blurred background can dampen annoying elements, while a sharp foreground helps to create depth and a sense of size ratio in an environmental image. To be able to compose optimally requires practice and you will never be fully trained at this as you constantly face new challenges. This makes the art of photography so much fun.

Saving images

You will probably save **thousands of images,** both original, processed and in various formats, on your computer. Therefore, create a simple folder system for this that meets **your needs**. A good test is whether you can find a certain image within **15 seconds** (with all relevant data, see below) and that you can easily, quickly and securely save copies of new photos, including data, in the correct folder without having to re-copy old photos to external memories (or "the cloud" if you prefer).

A well-functioning system is based on that images, including descriptive data/keywords, are saved on the computer as soon as possible. Always make **backups immediately** after images with data/keywords have been downloaded to your computer. Editing photos and new backups of edited photos, on the other hand, can be done much later when you have plenty of time**. Always edit** on a **copy** of the original. Make a note of how the image has been edited in the file in case you want to make a new edit later.

We use a natural folder system based on main folders and underlying folders with photos. This gives us a direct sense of the different types of images we have saved and how many. For photo editing and tagging of photos, we use Photoshop Photo Editor and the Organizer, Lightroom or NIKON NIS-Elements (microscope photography). You can search for photos with combinations of keywords you have entered for each photo, such as year, location, species, gender, age, personal name, etc., which gives many search options. In combination with a good natural folder system, you get the best of both worlds (**simple overview** and advanced search option **for all** photos).

Your photos are **valuable** and represent hard work over many years. It is therefore a good idea to have stored external memories in other places (with relatives or friends) in case of burglary or fire. It might be an idea to copy everything to new external memories (we have at least four of them) after a number of years. We would also like to suggest copying your very best photos to **large** hard copies. A photo album as a gift/Christmas present is appreciated as it represents one's own work and sometimes shared memories.

BEFORE SHOOTING STARTS

What to remember before wildlife photography

Empty the memory cards after copying to computer

Charged battery + extra batteries

Flash with charged batteries + extra batteries

All lenses cleaned and **locked zoom as** well as lens cleaning cloth in the camera backpack.

A rain protection for camera/lens (they can be expensive but you can easily make one yourself)

A rain protection for camera backpack (should be included with purchase)

Tripod

Binoculars

A portable hide/camouflage clothing, coaster/field chair

Thin rainwear in the camera backpack

Notebook, pen, food and drink

Some general tips

Take note of the times of the animals' active periods and find optimal photo locations where hides can be prepared. Don't forget the expected position of the sun and that immediately after a rain you can get nice pictures (e.g., of animals with wet fur, water droplets on the object, etc.)

The hour after sunrise and before sunset provides less shadows and more even lighting

Be out in good time before the animals arrive and test settings

Try to capture different behaviours of the object (be patient) and read up on their biology

Keep track of exposure time and background, and depth of field

Test different focal lengths

Test different camera positions

Don't forget to compose the image according to the idea you have of the image's purpose

Join a photo club and internet groups

TELE PHOTOGRAPHY

The Nikon D500 is an excellent camera for wildlife photography. We use the **ASF-S NIKKOR 200-500mm 1:5.6E ED telephoto** lens. Since it's an FX lens ("full frame"), we get about **300 - 750mm** focal length ("crop factor" = 1.5) on the Nikon D500 (which is a "half-frame" camera, DX). The minimum distance of focus is at 2.2 m.

When taking photos with a telephoto lens, we have **still** and **moving** objects for which there are several settings to choose from. Once we have decided what to shoot, we immediately change some of our default settings and make test photos. We only give tips on a few settings and you need to try it out for yourself and get experience of different settings for different photo situations. A tripod may be necessary if you cannot take support from e.g. a tree or a car. However, even with a relatively heavy telephoto lens, you can often do without support if the exposure time is around 1/3000 of a second. Tripods are difficult/impossible to use if you want to follow flying birds and in rugged terrain. For longer exposure times, a tripod or other support is necessary.

In order to shoot fast objects, such as fast flying birds, you can use the viewfinder: **AF-C with d25 or 3d**, **C$_H$ 30**, **Auto ISO**, time **1/4000**, **WB A** or other choice depending on the weather (the symbols are best seen in the monitor!) and **Spot** metering of the light (important if large light background and dark small object). Adjust spot metering with Exposure Compensation and take test shots in advance. Track the object (with AF-ON depressed) and press the shutter. Do not use a tripod.

In order to shoot close and relatively stationary animals: AF-C setting since even small movements can occupy a large part of the image area. Set shutter selection to **Q 1** (single image) for **lower sound**. Take the picture, hold down the shutter button, see if the animal reacts, and then release the shutter button when the object is not expected to hear the camera. The picture is taken at the time of the press down. If the object appears to be out of earshot, we use **QC 3** or **C$_H$ 30.** Otherwise: **ISO 100, WB A** and **A, S or M (**if time and/or aperture should be prioritized), **WBA** (or other choice depending on the weather) and **Spot** (basic setting) or **Centre-weighted measurement** of the light depending on how much the object is in the background. If necessary, adjust the camera's exposure selection using the +/- Exposure-Compensation button. Test settings in advance if possible. Use **a tripod** if possible.

In **all photography**. Select **Manual Focus** if autofocus is not working optimally, e.g., if **the object** is behind **branches.** In the large **monitor**: press the **+ button** (left back) to **magnify** the object while focusing (if time permits).

MACRO PHOTOGRAPHY

It's a good idea to start shooting motionless objects first, as it's easier. There are good objects everywhere that are suitable for macro photography, not just insects and flowers, and it pays to be creative in your search and give the hunt for interesting photos the time it requires. Macro photos have one thing in common with UV photos as they often show something that you haven't seen before. Don't forget that macro photos can also convey emotion and activity, and the rules of composition are therefore just as important in macro photography. Remember that you **don't** have to include the whole object. It is easy to forget to test different camera angles when photographing small objects. Different weather conditions also provide opportunities for unexpected effects.

The Nikon D500 is an excellent camera for macro photography down to a 1:1 scale. We use the AF-S Micro NIKKOR 85 mm 1:3.5G ED macro lens. Macro photography often includes small objects that occupy a **large part** of the frame and a very **limited depth of field** is the rule. Even small movements can cause problems, but with an 85 mm lens you will have some distance to the object. As shooting situations in the field can vary (e.g. insects with the ability to fly and wind or a seashell), you have to test your way to optimal settings. **Manual focus** can have a clear advantage when you e.g., want to make sure that an insect's eyes are in focus. However, do not forget to set the **lens** and **camera** to manual focus mode.

In field situations with **moving** objects, you are usually short on time and an **AF-C** setting, **CH 30, Mode M** with time around **1/500, f-8,** Auto ISO, WB A and **Matrix or Centre-weighted metering** can be a good start**.** A problem in macro photography is the shallow depth of field, which can be increased with a low aperture **(f/8 - f/22).** Adjust the exposure metering with the **+/- Exposure Compensation button.**

When shooting **still objects** with a tripod, you can increase the depth of field by **increasing** the **exposure time** and **f-value**, and use manual **ISO 100** to reduce blur**.** Press the **+ button** to **magnify** the object in the large monitor for easier focusing. This is especially useful for observing the **limited depth of field** in **macro photography.**

A **ring flash** designed for macro photography improves the exposure of cavities and may be necessary for good light and colour reproduction. Flash is also used outdoors if necessary (even in daylight). We use the ring flash **NISSIN MS18 Macro** which has built-in LED lighting for better focusing (automatically turns off during exposure time) and an exposure time of 1/250 second and ISO setting of 5560 k. This macro flash is fast, doesn't overheat, and is fully compatible with the Nikon D500. Note that when using flash, you take one photo at a time (**Left** spin selector: **S**). For **z-stacking** (merging similar images but with different focuses), flash use, 3D modeling of small objects, computer-controlled photography and microscope photography, we refer to Øresland. V & Oxby, G. (2021) and Øresland, V. & Oxby, G. (2022) on the back of this guide. These guides provide many tips for macro photography and computer-controlled photography and can be downloaded for free from **Research Gate > Vidar Oresland > research.**

UNDERWATER PHOTOGRAPHY

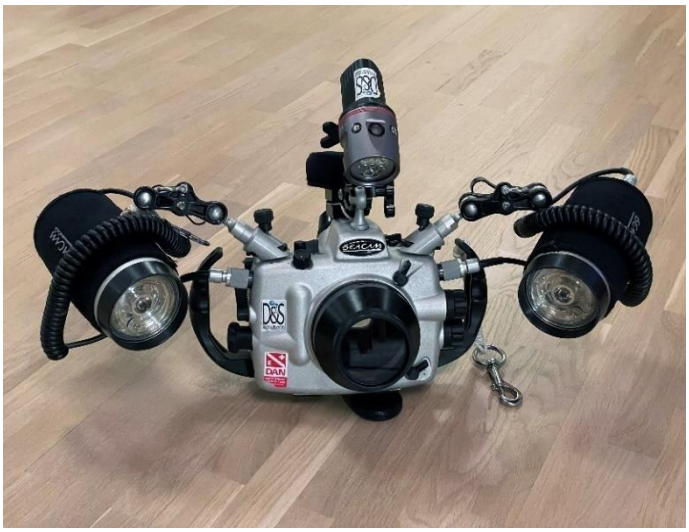
Underwater photography is something that many scuba divers want to try when they feel that they have fully mastered diving. This is both an exciting and demanding hobby that requires skill both as a diver and as a photographer. **The Nikon D500** is ideal for underwater photography (**fig. 2**) and there are a number of different custom underwater cases on the market. **Figs. 3-5** show our **SEACAM** silver **underwater case** in various configurations, with two UV flashes (**SEAFLASH 150 DIGITAL**) and a focus light. The photos show that these configurations make it possible to shoot completely different objects (manual camera settings). Let it be quite clear that equipment of this calibre is not free and it is wise to investigate the second-hand market. You can of course use a GoPro camera with an underwater case and lighting, but the difference between these options is very big. Today, UV photography is common among recreational divers with different skill levels. A reliable tip is to find a dive buddy with photography experience and listen to what special qualities you need in order to feel confident with photography under the surface. A good idea is to borrow a simple camera equipment to start with before you invest in your own. It can still be a good idea to start with a cheap alternative and, if there is interest, later invest in more expensive equipment (second-hand?).

The main **difference** between land and UV photography is **poor visibility** due to plankton and degradation products from organic matter and that you have to have full control over your diving at the same time. The problem of poor visibility is reduced with short shooting distances. Shooting close to soft bottoms requires that the diver does not swirl up bottom material and is able to move slowly and in a controlled manner in all directions, including backwards, so as not to scare away the object while handling the camera. A well-practiced diving technique is therefore critical for good photo results. Compared to photography on land, UV photography has a significantly higher and longer **learning curve**.

To get started with UV photography, you should start on shallow bottoms (<10 m) so that you can dive for a long time and take a lot of photos of different objects to test camera and flash settings and get to know your equipment and modify your diving technique. Use your dive logbook as a photo journal as well. Save "type photos" of different types of motifs (in their own folder) that can be analysed, which greatly facilitates both comparisons and learning. It is important to always document external factors such as depth, temperature, currents, visibility, time and position. Data from the camera and flash settings in the photo's file information can be linked to the dive data in a modern dive computer. The prerequisite is, of course, that they are both time-calibrated. This means that you can subsequently detect the depth and prevailing temperature at which you took the image in question. It is not uncommon for recreational divers' photos to be of great scientific value when unusual species or behaviour are well documented.

Fig. 2. The anterior nudibranch is *Polycera quadrilineata* and the posterior one is *Facelina bostoniensi.* The photo was taken during the egg-laying period at a depth of 4 m.
Nikon D500: F/25 1/250 sec ISO 100 AF-S. **Micro Nikkor 40 mm Cover Lens +2**.

Macro configuration



SEACAM silver NIKON D500
SEAFLASH 150 DIGITAL
No/short flash arms

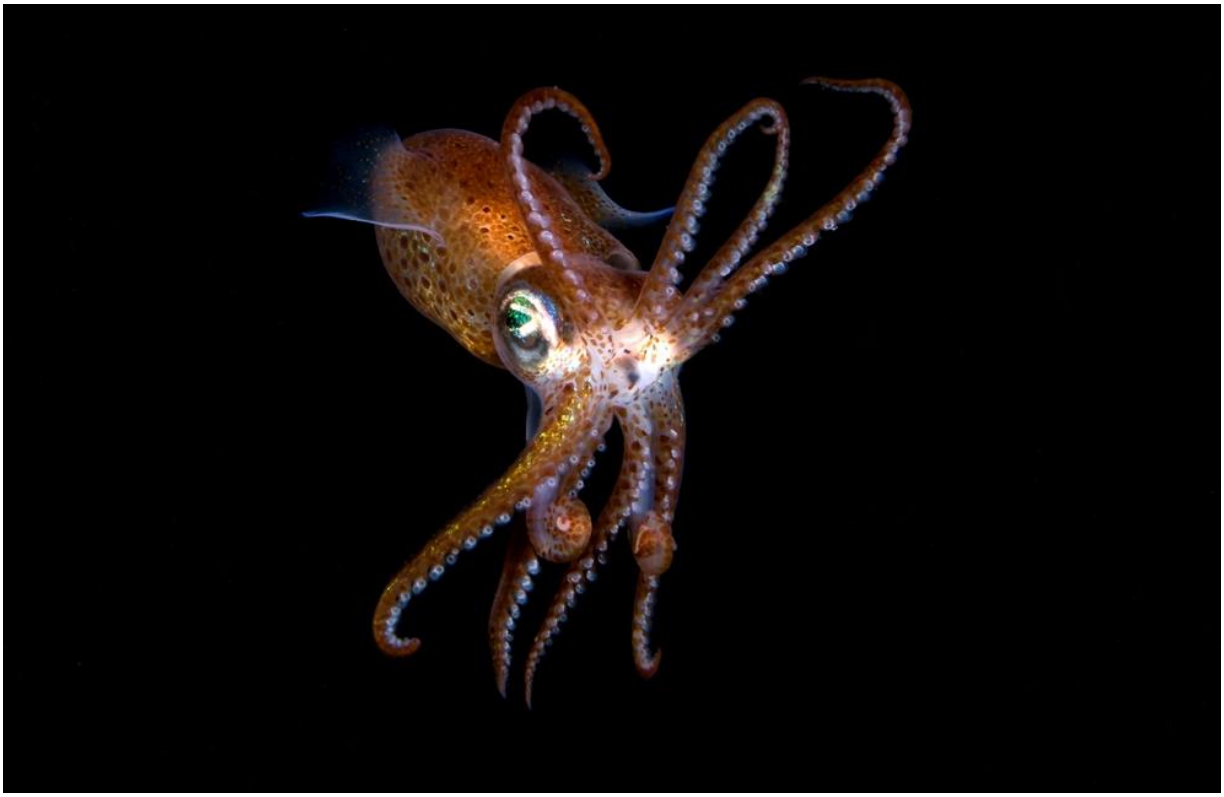


Fig. 3. Macro. The bobtail squid *Sepietta oweniana* at a depth of 12 m. Cover lenses can be used to create super macro. **Nikon D500:** F/22 1/250 sec ISO 100. **AF-S Micro Nikkor 40 mm**, **Cover lens +2.**

Normal configuration

SEACAM silver NIKON D500
SEAFLASH 150 DIGITAL
Short flash arms

Fig. 4. Normal. The European lobster, *Homarus gammarus,* during night at a depth of 9 m. Zoom lenses are most common and more useful than fixed focal lengths. **Nikon D500:** F/14 1/250 ISO 200 focal length 17mm. **AF-S Nikkor 17-55mm.**

Wide angle configuration

SEACAM silver NIKON D500
SEAFLASH 150 DIGITAL
Long flash arms

Fig. 5. Wide angle. Zoom lenses are most common today and more useful. However, the fisheye can create other effects and you get even closer to the object. **Nikon D500: f**/16 1/250 ISO 800 focal length 10mm. **AF-S Nikkor 10–24 mm.** Alternatively, an **AF Fisheye Nikkor 10.5 mm** can be used with similar results.

VIDEO

The Nikon D500 works ok for video recording. Recording is done via the **large monitor**. It can be difficult to see if sharpness is present in the monitor, especially in strong sun. **Use a tripod** and make calm movements with the camera. We have already selected the **autofocus mode** (AF-F and NORM**)** for the monitor using the knobbly button inside the focus lever (on the left side of the front of the camera) and the rear and front **spin selectors** as well as **2160/30** as the **Image Size/Frame Rate** as the default settings (in the Meny). Turn the **LV** knob to **Video** (our **default setting**). Choose **point measurement** instead of matrix measurement of the light (see made selection in the lower left corner of the large monitor) if the object occupies a small area (**bird of prey at a great distance**). Selections made are **shown in yellow** in the monitor when the AF button is pressed. If all these settings are made in advance, you can **start** video recording **right away**.

Start videorecording

Note that the continuous autofocus for video is **slow,** so avoid **fast movement**. To save time, you can start **with AF-ON to focus.** Use AF-ON during recording if continuous autofocus is too slow. Use a tripod.

1. Press the LV button to open the monitor.

2. Use AF-ON if needed.

3. Press the red video button to the left of the ISO button when the object is in focus and recording begins. A red dot and REC are now visible in the monitor as well as the remaining recording time.

4. Press the red video button again to **end** the recording.

5. Open the video as for photos (arrow button on the left front) and press the middle button of the multi-selector (ok button) to play the video and the down arrow to stop the video.

We **don't use an external microphone** (yet) and have **the camera microphone** on **OFF** to get a silent movie without disturbing camera noise. We use the **QXD (64 GB)** card as the **first card** and the **SD (256 GB)** card as **extra space** when the **QXD** is full. Both video and photos are then saved on QXD (without the need to make a new primary card selection in the field to make a video (which requires a fast XQD card). You can also have SD as the first card for photos and then switch to QXD when filming to get maximum space for video data. To change the slot: ***Menu*** > *Camera* > *Select Primary Slot*. Se the various websites of the internet for Nikon D500 video.

SETTINGS IN THE MENU

Some settings are only made in the menu and they can limit the number of options in the camera body's buttons and spin selectors. However, most setting changes are made to the camera body, so menu changes are not needed very often. Most of the menu settings are shown here. Those who are not included are either fairly obvious or of little importance. Sometimes we accept the camera's default. In addition, there are some commands such as start slideshow and transfer images to smart device. The English names may be not be totally correct since we do not use an English menu.

Display menu (black arrow)

Display Folder - **All**

Display Monitor Options – Focus **Point, Shooting Data, and Overview**

Viewing the captured image – **ON**

After Deletion – **Show Next**

By series, view – **Last image in the series**

Automatic Image Rotation – **OFF**

Rotate High – **OFF**

Photography menu (camera)

Photography Menu Bank and Extended Menu Banks – **We don't use this**

Extended Photograph. Menu Banks – **Off**

Storage Folder - **ND500**

Name File – Accept **<standard DSC**

Select Primary Slot - **XQD**

Secondary Tray Function - **Extra Space**

Select Image Area - **DX (24*16)**

Image quality – **TIFF (RGB).** Others may prefer NEF (RAW)

Image Size – **JPEG/TIFF** > **Image Size – Large 5568*3 712:20.7M** or **NEF (RAW) L**

NOTE: Saves in NEF (RAW- 14-bit, lossless compression (this is used by the camera only when image quality NEF (RAW) is selected instead of TIFF.

ISO Sensitivity Settings -ISO Sensitivity-**100**, Auto ISO Sensitivity-**ON**, High Sensitivity-**2500**, Highest Flash Sensitivity-**250,** Slowest Shutter Speed - **AUTO**

White balance – **AUTO$_1$ Normal**

Set Picture Control – **SD** (Standard)

Managing Picture Control -- We do not use this feature

Colour space – **Adobe RGB.** Adobe RGB's colour space has a larger colour palette than sRGB, especially in the cyan to green and orange colour spaces. As a result, Adobe RGB photos look better than sRGB when printed, while they don't look as good as sRGB when viewed on a screen. Because Adobe RGB has a larger colour space than sRGB, you can **convert** Adobe RGB to sRGB — but not vice versa.

Active D-lighting – **OFF** (ON for high-contrast objects and matrix metering, corrects shadows and bright areas)

Long Exp. Noise Cancellation – **ON**

High ISO Noise Reduction – **NORM**

Vignette control – **Normal (N)**

Automatic distortion control – **ON**

Flicker reduction – **ON**

Automatic Forking – **AE**

Multiple exposure – **OFF**

HDR (High Dynamic Range) **- OFF**

Interval Timer Photography – **OFF**

Movie Recording Menu (Camcorder)

Reset Movie Recording Menu – **NO**

Name give file – **accept > default prefix ASC**

Target – **XQD**

Image Area **- DX**

Image size and frequency – **2160/30** (3840*2160:30p

Film quality – **HIGH**

ISO Sensitivity Settings - ISO Sensitivity (Mode M **- 100, Auto ISO Sensitivity** (Mode M) - ON, Maximum Sensitivity **- 2500**

White Balance **– AUTO** – **Same as Photo Settings**

Set Picture Control **- SD** (Standard)

Managing Picture Control -- We do not use this

Activate D-lighting – **OFF**

High ISO Noise Reduction **- NORM**

Flicker reduction – **AUTO**

Microphone sensitivity – Microphone **OFF** (if not using microphone), **manual** sensitivity if microphone is on

Frequency Response (for audio) – **WIDE** (note: this is not the same WIDE as the autofocus option in the monitor)

Wind Noise Reduction – **ON**

Create timelapse movie – **OFF** (make all settings **here** for timelapse shooting)

Electronic vibration reduction – **OFF**

Customization menu (pen)

Bank for the customization menu **- accept A**

A Autofocus:

a1 Select AF-C Priority – **Shutter Priority**

a2 Select AF-S Priority – **Shutter Priority**

a3 Lock-on Focus Tracking **- Fast** and **Erratic**

a4 Face Detection – **OFF**

5a 3D tracking area – **NORM**

a6 Number of focus points – **AF55**

a7 Save by orientation – **OFF**

a8 AF activation – **ON** > **Shutter/AF-ON**

a9 Limit - AF-area mode selection **- No restrictions** (**tick all options)**

a10 Limit of autofocus mode – **OFF** > **No restrictions**

a11. Loop focus point selection – **OFF > no looping**

A12**.** Focus Point Options > Manual Focus Mode – **ON**

B Metering/Exposure – default settings except:

b5. Matrix measurement **- OFF > face detection off**

b6. Centre-weighted area – **Avg. Medium**

C Timers/AE-Lock – defaults except:

c1. AE lock via shutter release button **- OFF**

c2. Standby timer **- 6s**

D Shooting/display – default settings except:

d1 Frame rate for C_L mode – **3** (C_L)

d2 Max continuous release – **30** (also for C_H)

d3 ISO speed display – **OFF** > **Display the number of shots that can be taken**

d5 Exposure Delay – **OFF**

d6 Electronic Front Curtain Shutter - **ON**

d7 File Number Sequence - **ON**

d8 Viewfinder Grid – **ON**

d9 LCD Lighting – **ON**

E Bracketing/flash (Mode M)- default settings except:

e1 Flash synchronizing rate – **1/250**

e2 Flash Shutter Speed – **1/60**

e3 Flash Exposure Comp – **Entire Composition**

e4 Auto ISO Sensitivity – **Motif Only**

e5 Modeling Flash – **OFF**

e6 Auto. bracketing (Mode M) – **Flash/shutter speed**

e7 bracketing sequence **– Meter > under > over**

F Lever - Default Settings

G Movie - Default Settings

Settings Menu (Wrench)

Formatting Memory Cards - **Be Sure to choose the right memory card!**

Language – **your choice**

Time zone and date – **check this**

Monitor brightness – **0**

Monitor Colour Balance – (no correction for colour)

Virtual Horizon – **when needed**

Information Display – **AUTO**

AF fine-tuning – **ON**

Cleaning the Image Sensor **-- on Startup and Off**

Reference image for dust removal – **when needed**

Image Commentary – **OFF**

Copyright Info – **your Name**

IPTC – (better to **do in PC,** i.e. add your own data for the image)

Signal – Volume – **OFF**

Touch Screen Controls – **OFF**

HDMI – **Auto**

Location data – **we do not use this**

Assign Fn on remote control – **we do not use this**

Airplane Mode **- OFF**

Transfer to smart device – **OFF**

Wi-Fi – **OFF**

Bluetooth – **OFF**

Conformity marking --

Battery type in MB-D17 – **FR6 (AA Lithium)**

Battery Order **- D500 - Use Camera Battery First**

Battery Information – **provides battery level and number of shots taken**

Function without memory card – **LOCK, shutter disabled (**prevents photos from being taken without being saved)

Save/load settings – **Save settings**

Reset Settings – **Do Not Reset** (Resetting Provides Factory Defaults)

Firmware version - **C1.30, LD 2.018.** When updating software, all personal settings must be redone**.** Check differences between your software and the latest available on Nikon: Nikon | Download center | D500 Firmware (nikonimglib.com). Sometimes the difference is minimal and an update may not be worthwhile.

Setup History (Note Block)

Showing the selections made

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Euroasian Eagle -Owl (*Bubo bubo*), male. Nikon D500, AF-S Nikkor 200 – 500 mm 1:5.6E ED, f/5.6, 1/3200 sec. ISO 560

Publications from Divers and Scientists West Coast Sweden

Øresland, V., Ulmestrand, M., Agnalt, A.-L., Oxby, G. (2017). Recorded captures of American lobster (*Homarus americanus*) in Swedish waters and an observation of predation on the European lobster (*Homarus gammarus*). **Can. J. Fish. Aquat. Sci.** 74: 1503-1506

Øresland, V., Oxby, G., Oxby, F. (2018). A comparison of catches of European lobster (*Homarus gammarus*) in a lobster reserve using traditional pots and scuba diving technique. **Crustaceana** 91: 1425-1432

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Øresland, V. & Oxby, G. (2021). A photo-illustrated dissection guide for bobtail squids. Divers and Scientists West Coast Sweden, **Guide No.1**., 122 pp

Øresland, V. & Oxby, G. (2022). A 3D modelling guide for small animals using photographs. Divers and Scientists West Coast Sweden. **Guide No**. **2**., 70 pp

Øresland, V & Oxby, G, (2023). Divers and Scientists´ Nikon D500 camera and photography guide. Divers and Scientists West Coast Sweden. **Guide No. 3**., 33 pp.