New Zealand Parachute Industry Association

NZPIA

Water Landing Guidelines

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RECORD OF REVISIONS

Each page of this manual includes the page number and date of issue. A ruled vertical line in the left-hand margin indicates recent changes

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INTRODUCTION

Water descents are descents into a body of water, e.g. a lake or ocean. There are two kinds of water descents: Intentional (planned) and unintentional (unplanned). Both can be done safely with the proper training, planning and preparation.

Planned water jumps, with the proper precautions, can offer safety advantages to skydivers by allowing them to hone the required skills under controlled circumstances. This can increase their chances of survival in the event of an unplanned water landing.

Unplanned water landings can happen for a variety of reasons, such as spotting errors, weather changes, malfunctions, aircraft emergencies, etc. Many drop zones in New Zealand are close to water, so the risk of an unintentional water landing is ever-present.

Risks

There are a number factors which increase the safety risks on a water descent, compared to landing on land:

1. Drowning is the most obvious of these. Non-swimmers and weak swimmers are at the highest risk, but even strong swimmers can get into trouble in challenging conditions, especially if they are unconscious upon entering the water, or injured on landing.

   Flotation gear and an effective water rescue plan will give parachutists a better chance for survival.

2. Diminished depth perception over water increases the risk of injury caused by an uncontrolled landing. Unless there are objects such as boats or buoys on the surface nearby, it can be very difficult to determine height above the water. It is also very difficult to gauge the depth of the water or if there are any submerged hazards such as rocks.

   A conservative landing approach and PLF are recommended for all water landings.

3. Entanglement with equipment can hinder a person's ability to swim or tread water, leading to an increased risk of drowning. Equipment such as weight belts and jumpsuits can also hinder flotation and mobility, making it more difficult to swim or stay afloat.

   Parachutists should have a plan for entering the water and discarding their equipment, if necessary.

4. Panic uses up vital energy and can lead people to behave unpredictably. It is very easy for panic to set in, especially during an unplanned water landing or if something has gone wrong during the jump or on landing.

   The potential for panic can be reduced with proper education, training and practice.

5. Hypothermia significantly reduces survivability time in cold water. Cold will also affect dexterity and mental concentration, making it difficult to discard equipment or swim.

   All parachutists taking part in jumps into or near water should have an appropriate water rescue plan in place, and practice it often.

The training and recommendations that follow are intended to provide parachutists and Instructors with guidelines for safe skydiving into and/or near water.

***N.B.** The procedures that follow are considered appropriate for **most** jumpers on **most** jumps. They are guidelines, not mandatory procedures.*

It is not possible to come up with one universal procedure that is appropriate for all jumpers in all scenarios. All parachutists are encouraged to read these guidelines and use their judgement when developing their own personal water safety plans.

PROCEDURES FOR UNINTENTIONAL WATER LANDINGS

Procedures for Solo Jumpers

Most important is knowledge and preparation: know where the water is and the likelihood you will land in it; plan how you will deal with that; learn the drop zone's water rescue plan.

1. Steer the canopy to avoid the water if possible, but prepare for the possibility of entering the water, rather than spending too much time trying to avoid it.
    - If landing in the water is inevitable, try to get as close to shore (or a boat or buoy) as safely possible, BUT
    - Avoid choppy or fast moving water if you can. It is better to land in calm water farther out than turbulent water closer to shore.
2. Disconnect the RSL (if applicable).
3. Don and inflate your flotation device if you have one (you may have to discard your helmet).
4. Before entering the water, disconnect the chest strap to make it easier to swim out of the harness after landing. Try to keep your hands in the toggles while you do this.
5. Consider also loosening the leg straps slightly, if there's time and if your canopy is not too sensitive to harness inputs.
    - Don't loosen them too much or you won't be able to reach the toggles;
    - *Do not unfasten the leg straps completely unless you are already in the water!*
6. Consider discarding any unnecessary equipment such as weight belt, shoes, gloves, as these will weigh you down and make it harder to swim/tread water.
7. Steer into the wind if safe to do so.
8. Carry out a full flare for landing, or flare to half-brakes if you are unsure about your height over the water. Land with feet and knees together and prepare for a PLF, in case the water is shallow or there are submerged hazards.
9. Take a deep breath and enter the water with your lungs filled with air.
10. After entering the water, let go of toggles, cut-away and climb out of the harness.
    - *Always remain in the harness and attached to the canopy until you are in the water!* Cutting away before entering the water is not recommended as height above the water and the depth of the water are very difficult to judge.
    - If your reserve is deployed and you have no flotation gear, get out of the harness and away from the canopy as quickly as possible. Use a hook knife to cut yourself free if you become entangled with the lines.
11. Once in the water, if the canopy comes down over your head, follow one seam to the edge of the canopy until clear of it. Push the canopy up with your fist to create an air pocket.
12. The container with a packed reserve inside can serve as a flotation device if necessary. A container with a packed reserve will remain buoyant for up to 45 minutes or longer.
    - Caution must be used to avoid the main canopy suspension lines if the reserve container is used for flotation.
13. Take a deep, full breath of air at every opportunity.
14. If you haven't already done so before entering the water, discard any equipment that is weighing you down or hindering your breathing or ability to swim, e.g. weights, shoes, helmet, even the parachute system itself. *Your safety is more important than any equipment!*
15. Consider swimming to shore if it's close, but remember that swimming will use up energy more rapidly than floating.

Additional Procedures for Tandems

Tandem water landings are to be avoided if at all possible. The complications associated with two people being connected in the water exaggerate the safety risks present on solo water landings, and introduce additional risks that are not present on solo water landings. For example –

1. Two people struggling together against their equipment/environment creates the risk of them injuring themselves or knocking themselves unconscious. It also makes it harder for the tandem master to disconnect the passenger and carry out other tasks necessary for the safety of the pair.
2. A passenger may be more likely to panic than an experienced jumper, especially if they are also a non-swimmer. This can result in unpredictable behaviour such as struggling against the tandem master, clinging to the tandem master, failure to follow instructions, etc., making it harder for the tandem master to get control of the situation.
3. Entanglement with equipment is more likely with four arms and four legs moving around the canopy/suspension lines.

Unfortunately, it will not always be possible to avoid a tandem water landing, so tandem masters must be prepared for one. Start with education and training from a Tandem Instructor Examiner. Training should include theoretical training, ground practice, practical training in the water, and regular refreshers. Training Guidelines can be found in Appendix A.

The NZPIA's recommended procedure for unintentional tandem water landings is the same as for unintentional solo water landings, with the following additions/adjustments –

1. Release the RSL as soon as you are sure you will land in the water.
2. Raise the visor on your helmet (if applicable) and calmly explain the situation to the passenger; talk them through your actions to reassure them that you are in control.
3. Have the passenger don and inflate their flotation device.
4. Disconnect the lower passenger attachment points.
5. Undo the chest strap on the tandem master harness.
6. Steer into the wind. Instruct the passenger to lift their legs up for landing, keeping their feet and knees together
7. Instruct the passenger to hold on firmly to their flotation device and take a deep breath just before entering the water; also take a deep breath yourself just before entering the water.
8. Count down to entry if possible (for passenger's benefit) then full flare into wind for landing.
9. Once in the water, release the main canopy.
    - *Do not cut away before entering the water!*
10. If the canopy lands on top of you, push the canopy up with your fist to create an air pocket for you and your passenger to breathe and communicate; follow a seam to the edge of the canopy.
11. Release the top passenger snaps and push the passenger away; instruct the passenger to stay within sight of you.
12. Don and inflate your own flotation gear and swim out of your tandem master harness; try not to lose sight of the passenger while you do this.
13. Stay calm and continue reassuring your passenger;
    - Try to avoid getting separated from your passenger; if the passenger is calm, holding onto one of the side connectors will help you stick together, BUT
    - Do not get too close to a panicking passenger as this can increase the risk to your safety and theirs. Keep them in sight but at least an arm's length away from you.
14. If your flotation device has a mirror and/or a whistle, use them to get the attention of rescuers.

Other Considerations – All jumpers (solo and tandem)

1. Ensure all Personal Flotation Devices (PFDs) are serviceable and properly maintained.
2. Staying close to your canopy will help rescuers to find you, but be mindful of fabric and lines in the water.
    - Stay far enough away from canopies to avoid entanglement.
    - Have your hook knife ready, in case you do become entangled in lines.
3. Camera flyers and others carrying additional equipment need to take this equipment into consideration when planning and practicing their water landing procedures.
4. Hard landings:
    - If you think you will land hard in the water, it may be best to keep your helmet on until after you are in the water, especially if you are on a tandem, to avoid getting knocked unconscious on landing.
    - Perform a PLF on impact. This is especially important on a tandem, to avoid landing on top of the passenger.
    - Consider not inflating the PFD until you are in the water, due to the risk of it rupturing on impact. But also consider the possibility of being knocked unconscious on landing and not already having an inflated PFD. In general, the NZPIA recommends partially inflating the PFD prior to entry in the water as the option with the least risk.
5. Malfunctions:
    - If you have had a cutaway, chances are you will have less time to think/act before entry into the water. Having a plan that you have memorised and practiced will help.
    - You will also have less time to brief/reassure your passenger. Pre-briefing passengers to be prepared for an emergency water landing will help.
6. Cold water:

    Water temperature must always be a consideration; low temperatures will significantly reduce the amount of time a person can survive in the water, and will affect mobility and dexterity (making it more difficult to deal with buckles and snaps, etc.)

    - If you know the water you will be landing in is cold, and you have a functioning PFD, consider keeping your shoes on to minimize heat loss from the feet. If you do not have a PFD, discard your shoes as they will weigh you down.
    - Be prepared for cold shock – sudden immersion in cold water may cause you to gasp for air or start hyperventilating. Be prepared and try to control those urges to avoid inhaling/choking on water.
        - Warn your passenger of this as well, to help prevent panic.
    - Treading water or swimming will cause the body to lose heat more rapidly, because blood moves to the extremities and then cools more rapidly. Depending on the situation, and if you have a PFD, it may be better to float rather than use up precious heat and energy trying to swim or tread water while waiting for help to arrive.
    - If you think you will be in the water a long time, use the Heat Escape Lessening Position (HELP)—hug your knees to your chest—to conserve body heat.
        - If you are in the water with other people, *and everyone is calm*, huddle together with arms around each other and torsos together, to share body heat. Do not get close to panicking people though, as they can put your safety at increased risk.

7. Water rescue plans

- Water rescue plans should be appropriate to the situation and the level of risk present. The definition of “appropriate” may vary depending on several factors, including –
  - the parachutist’s training, experience and equipment;
  - the PLA’s proximity to the water hazard;
  - the type of water hazard (e.g. warm or cold / calm or rough water);
  - the weather conditions;
  - the risk profile of the descent;
  - the parachutist’s personal risk threshold;
  - and other factors.
- All parachutists and pilots are encouraged to consider the possibility of an aircraft emergency over water as part of their personal safety plans and emergency procedures, whenever the jump aircraft’s flight path will take them over an open body of water during ascent.
- Participants should also consider the likelihood and potential consequences of an unintended water landing while injured or incapacitated, when carrying out their risk assessments.
- NZPIA recommends ensuring a recovery craft and trained rescue personnel are available during all planned exits over an open body of water and descents adjacent to a water hazard (e.g. a beach or lakeshore)
- Emergency response plans should be tested prior to operations taking place, and regularly thereafter.

*There are a lot of variables, and combinations of variables, that can be present during unintentional water landings. There is no one-size-fits-all formula for a good outcome; each individual jumper and tandem master must assess their specific circumstances and make decisions accordingly**.***

Plan, prepare and practice in advance to give yourself the best chance.

PROCEDURES FOR INTENTIONAL WATER LANDINGS (solo jumpers only)

Administrative & NZPIA Requirements

When making intentional water descents, all parachutists must –

- Hold an NZPIA Parachutist Certificate
    - *Intentional descents into water by student parachutists and uncertificated tandem passengers are not permitted*
- Be able to swim and be confident in the water
- Have undergone both theoretical and practical training conducted by an Instructor
- Be briefed by an Instructor prior to the descent (see Parachutist Briefing and Pre-Jump Procedures, next page)
- Comply with the NZPIA's procedures for descents near water (ref. NZPIA Documents, Standards and Procedures Manual, latest revision)

Preparation

Recommended preparations for organising an intentional water descent include –

- Choose a suitable site, preferably in fresh water; the site should have easy boat access
- Check the site for underwater hazards
- Obtain any required approvals, e.g. NZPIA, District Council or other local authority
- Draw a site plan for briefing and spotting
- Establish procedures for jumpers to identify the PLA from the air, and to control access to the PLA and surroundings by spectators and other boats
- Ensure at least one motorised recovery craft with trained personnel on board will be present near the intended landing area when the jumps take place
    - Establish the number of recovery craft available, ideally one boat per jumper per pass
    - Ensure each recovery craft carries both a driver and a recovery person. The recovery person should be prepared to go in the water, with face mask and fins, and have experience in lifesaving techniques including resuscitation.

Recovery Crew Plan and Briefing

The recovery plan/briefing should cover the following points –

- Establish a means of indicating the wind direction
- Establish a means of calling off the drop if radio contact is not possible
- The crew of each recovery craft is to be informed of the total number of passes, the number of parachutists per pass, and which parachutist(s) per pass to recover
- Crew are to take care near parachutists and equipment in the water, and be mindful of suspension lines which may be below the surface and not easily visible; propellers should not be turning during final approach to a parachutist
- Ensure crew understand the distress signal, i.e. one arm raised by the parachutist, and know to proceed to that person immediately

Parachutist Briefing and Pre-Jump Procedures

Prior to commencing the water descent operation, an Instructor should carry out the following –

- Ensure all parachutists meet the NZPIA requirements for intentional descents into water (see Administrative & NZPIA Requirements, previous page)
- Nominate one person per load to spot and be in charge of the exits
- A comprehensive gear check, including any additional equipment to be carried on the jump
- Brief all parachutists, making sure to cover all the following points –
    - Preparations
    - Equipment
    - Jump order and the number of parachutists per pass
    - Communications procedures, including the wind direction indicator and no-go signal
    - Procedures for the actual jump (see Descent and Landing Procedures, below)
    - Recovery procedures
    - Possible emergencies that may occur after water entry, and the proper corrective actions
    - The agreed distress signal, e.g. one arm raised
    - Care of equipment during and after the jump

Equipment

- Each parachutist must have flotation equipment; preferably a wetsuit also
- RSLs must be disconnected
- Water may damage some altimeters and automatic activation devices, however –
    - Altimeters are still mandatory for delays of greater than 10 seconds
    - AADs are still mandatory unless a waiver has been granted by the NZPIA
    - Jumping without an altimeter, AAD or other standard equipment requires extra care

Descent and Landing Procedures

- No exits should take place until all jumpers from the previous pass have been recovered
- Jumpers should open with plenty of time to prepare for water entry, especially if there are other risk factors such as a small landing area or there are hazards present
- Recommended landing procedures are to inflate the life vest and then proceed with standard landing procedures: land into wind and flare as normal
    - *Before attempting high-performance landings across water, jumpers should obtain training from a person experienced in high-performance water landings*
- Once in the water, cut away the main but stay in the harness until recovered by the recovery crew. The packed reserve will provide additional buoyancy, and the harness will provide easy lifting points for the recovery crew to help you into the boat.
    - Never cut away the main before landing! Many people have been injured doing this
    - If your reserve is deployed you should get out of the harness and away from the canopy to avoid getting tangled in the lines

Post-Descent

- Ensure all parachutists have been accounted for and that all equipment has been recovered.
- Arrange a suitable place to rinse canopies, and dry all equipment out of the sun.

APPENDIX A: TRAINING FOR WATER LANDINGS

Proper training for water landings will decrease the likelihood of panic in the event of an unintentional water landing, and should therefore decrease the likelihood of injury or drowning.

The main reference sources for water landing training are the latest revision of the *NZPIA Water Landing Guidelines* document, and the *APF's Tandem Water Landing Procedure* video, if available.

All water training, including dates and locations, should be documented in the parachutist's logbook.

Theoretical (Dry) Training for All Jumpers (solo and tandem)

Theoretical training for water landings is required for the following –

- All parachutists prior to applying for an NZPIA Parachutist Certificate; and
- All student parachutists prior to making a descent within one nautical mile of a water hazard; and
- It is recommended that all jumpers making descents within 500 meters of a water hazard have had this training, or refresher water training, within the previous two years.
- It is recommended that all jumpers making intentional descents into water have had this training, or refresher water training, within the previous year.

Training should be conducted by an Instructor or Instructor Examiner, and cover the following topics at a minimum:

1. Techniques for avoiding water hazards
2. Techniques to compensate for poor depth perception over water, e.g. if there is terrain nearby or boats or buoys nearby on the water's surface
3. Procedures for unintentional water landings, including –
    a. Preparation for water entry
    b. Actions following water entry
    c. Equipment considerations
4. Special considerations for high performance canopies, if applicable
5. Additional risks associated with cold water, malfunctions and hard landings
6. Recovery after landing

Training should include practice on the ground and in a hanging harness. Practice drills should be repeated until the jumper is able to perform the procedures quickly and efficiently.

Practical (Wet) Training for Solo Jumpers

Practical water training is mandatory for all jumpers taking part in planned descents into water, and is recommended for all jumpers making descents near water.

The safety of the participants must be the foremost priority during practical water training. Safety personnel trained in lifesaving techniques, including resuscitation, must be on hand, with spare flotation devices ready to deploy in case of emergency or panic. Terminate the exercise immediately if any participants are found to be at undue risk.

Practical water training should be conducted by an Instructor or Instructor Examiner, and should only be conducted following theoretical training as detailed earlier in this document.

Training should take place in a swimming pool or calm lake at least 2 metres deep. Normal jump clothing (e.g. a jumpsuit) should be worn during training to more accurately simulate what an unintentional water landing would really be like.

Training should be in three parts:

Part 1: Review

The Instructor is to review theoretical training with all participants.

Part 2: Water Safety Assessment

Each participant is to demonstrate to the Instructor that he/she can tread water for at least two minutes and swim at least 25 meters without any assistance or the use of a PFD.

Any participant who fails to demonstrate these skills to the Instructor's satisfaction should use a PFD throughout the training exercise.

Part 3: Water Landing Drills

- While wearing a parachute harness and container system and associated equipment (helmet, goggles, etc.), the participant is to jump into the water.
- The Instructor should then cast an open canopy over the jumper before any wave action subsides.
- The jumper should then perform the steps necessary to escape from the equipment and remain afloat in the water.
- This drill is to be repeated at least one more time, and continued until the participant is able to perform the procedures quickly and efficiently.

NOTE: Only one participant at a time should be in the water with parachute equipment on. If more than one person is being trained, they should take turns with the drills so that the Course Assessor and rescue personnel are able to focus their full attention on one person at a time.

Practical (Wet) Training for Tandem Masters

The safety of the participants must be the foremost priority during practical water training. Safety personnel trained in lifesaving techniques, including resuscitation, must be on hand, with spare flotation devices ready to deploy in case of emergency or panic. Terminate the exercise immediately if any participants are found to be at undue risk.

Practical water training should be conducted by a Tandem Instructor Examiner, and should only be conducted following theoretical training as detailed earlier in this document.

Training should take place in a swimming pool or calm lake at least 2 metres deep. Normal jump clothing (e.g. a jumpsuit) should be worn during training to more accurately simulate what an unintentional water landing would really be like.

Training should be in three parts:

Part 1: Review

The Instructor Examiner is to review theoretical training with all participants.

Part 2: Water Safety Assessment

Each participant, regardless of whether they are participating as a Tandem Master or passenger, is to demonstrate to the Instructor Examiner that he/she can tread water for at least two minutes and swim at least 25 meters without any assistance or the use of a PFD.

Any participant who fails to demonstrate these skills to the Instructor Examiner's satisfaction should use a PFD throughout the training exercise.

Part 3: Water Landing Drills

- The Tandem Master is to simulate a solo water landing as per the procedures for solo jumpers (previous page).
- This drill is to be repeated as many times as necessary to satisfy the IE of the participant's competency and confidence in performing the procedures quickly and efficiently.
- Only when the Tandem Master is able to complete the solo procedures calmly and competently, he/she is then to simulate at least two tandem water landings wearing a tandem parachute harness and container system and associated equipment (helmet, goggles, etc.), and with an experienced parachutist acting as the passenger.
    - *NOTE: All participants on tandem water entry drills should wear a PFD, regardless of swimming competency.*
- On at least one of the tandem jump simulations, the IE should cast an open canopy over the pair before any wave action subsides.
- On all simulations, the Tandem Master is to perform the steps necessary to free him/herself and the passenger from the equipment and remain afloat in the water.
- This drill is to be repeated as many times as necessary until the participant is able to perform the procedures quickly and efficiently.

NOTE: Only one participant or tandem pair at a time should be in the water with parachute equipment on. If more than one Tandem Master is being trained, they should take turns with the drills so that the Course Assessor and rescue personnel are able to focus their full attention on one person or pair at a time.

APPENDIX B: REFERENCES

This document was prepared with the aid of the following references:

- USPA Basic Safety Requirements (2018 Skydiver's Information Manual)
- UPT Sigma Tandem Instructor Techniques (MAN-013 REV 0.4)
- APF Tandem Water Landing Recommendations
- Industry best practice