



Coastal Research: Evidence based approach

Background

There is currently no standardised method used to determine appropriate surf lifeguard service requirements on New Zealand beaches. As such, a surf lifeguard supervision model has been developed to enable the evidence-based provision of surf lifeguarding services into the future. The model will also help provide justification and empirical support for continued investment in surf lifeguarding services – Nick Mulcahy 2014

Nick Mulcahy is a coastal scientist and a long term club member at Titahi Bay SLSC, he is currently the Aquatic Safety Risk Manager at SLSNZ. His company, Coastal Research Ltd has been contracted by SLSNZ to carry out the National Lifeguard Supervision and Surveillance model, which will form part of the *Coastal Risk Management Framework*.

The current system

At present there is no formal way of deciding season length for the Volunteer and Paid Lifeguarding services. Location specific data is limited or not presented in a suitable format for evaluation. Decisions are often left to the club committees and patrolling occurs to the specified national season length. An evidence based approach will enable more effective decision making and ensure the SLSNR lifesaving services are future proofed both operationally and financially.

The research report

- Simply its aim is to align lifeguard services and provide services to the identified 'need'
- The research presents a revolutionary approach into how we patrol our beaches and how best to use our resources: **Lifeguarding 'smarter not harder'**
- The outputs are split into 2 parts, Lifesaving services and Support Services approaches.

1) Location specific coastal safety report:

- When a lifeguard service is required (daily patrol timings, season length & observational patrolling methods)
- Where to lifeguard (Patrolling methods and resources to cover base and satellite locations, roaming and outpost patrols)
- How to effectively patrol the location (Rostering advice, patrolling methods, support services and surveillance technology)
- What recommended and minimum equipment shall be used
- Additional advice surrounding community education, community water safety initiatives and collaboration with stakeholders.

2) Comprehensive regional supervision and surveillance report:

This extended report covers all beaches in the respective region that require some form of 'formal' or 'informal' service provision. The report will present a holistic approach to coastal safety; recommending signage, public rescue equipment, community response and provision



of a lifeguard service. The research will cover all currently patrolled SLSNR beaches and will recommended where a service is recommended (e.g Te Arai and Tawharanui).

What data does the model use?

The evidence based model uses various forms of data to produce the recommended surf lifeguard service requirements, which are then presented in a table form (see Table.1)

Although the coastal environment is highly dynamic, it is safe to assume that the risk to drowning and injury is linked to a variation in wave conditions and beach population thresholds. This risk can be sufficiently controlled by the provision of a suitably resourced lifeguard service or surveillance alternative.

The model uses the following data sources/factors to produce outputs:

- 1) **Long term wave data**
- 2) **Beach type;** Different beach types are more hazardous than others, e.g Rip currents are more prominent on intermediate than more sheltered tide modified beaches
- 3) **Number of water users;** including maximum daily head counts based upon 10 years of SLSNZ PAM data
- 4) **Total number of rescues;** 10 year statistics

A ratio is then calculated; this describes the proportion of lifeguards required for a set number of water users per hour (The base ratio is 1:25 at 0-0.5m surf conditions). The ratio will be based on the locations 75% percentile (majority of patrolled days that fall within a specified set of conditions and water users) to calculate the number of lifeguards required (Table 1).

Table 1: Recommended minimum surf lifeguard service requirements for the patrolling season, including daily and seasonal patrolling times and variances. The shaded areas represent the ‘peak’ demand for a lifeguard service.

Table 7-4: Recommended surf lifeguard service requirements for Te Henga (Bethells Beach) and Lake Wainamu on weekends.

| Day / Time | 09:00 - 10:00 | 10:00 - 11:00 | 11:00 - 12:00 | 12:00 - 13:00 | 13:00 - 14:00 | 14:00 - 15:00 | 15:00 - 16:00 | 16:00 - 17:00 | 17:00 - 18:00 | 18:00 - 19:00 | 19:00 - 20:00 | Days | Total hours |
|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-----------|----------------|
| October week 3: Saturday - Monday ⁴ | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3* | | | 3 | 67.5 |
| October week 4: Saturday - Sunday | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3* | | | 2 | 45 |
| November week 1: Saturday - Sunday | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3* | | | 2 | 45 |
| November week 2: Saturday - Sunday | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3* | | | 2 | 45 |
| November week 3: Saturday - Sunday | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3* | | | 2 | 45 |
| November week 4: Saturday - Sunday | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3* | | | 2 | 45 |
| December week 1: Saturday - Sunday | | 3 | 4 | 5 | 5 | 5 | 5 | 5 | 5* | 4* | | 2 | 82 |
| December week 2: Saturday - Sunday | | 3 | 4 | 5 | 5 | 5 | 5 | 5 | 5* | 4* | | 2 | 82 |
| December week 3: Saturday - Sunday ^{1M} | 4* | 4 | 5 | 7 | 7 | 7 | 7 | 7 | 7* | 6* | 4* | 2 | 126 |
| December week 4: Saturday - Sunday ^{2, 3M} | 4* | 4 | 5 | 7 | 7 | 7 | 7 | 7 | 7* | 6* | 4* | 2 | 126 |
| December week 5: Saturday - Sunday ^{2, 3M} | 4* | 4 | 5 | 7 | 7 | 7 | 7 | 7 | 7* | 6* | 4* | 2 | 126 |
| January week 1: Saturday - Sunday ^{1M} | 4* | 4 | 5 | 7 | 7 | 7 | 7 | 7 | 7* | 6* | 4* | 2 | 126 |
| January week 2: Saturday - Sunday ^{2M} | 4* | 4 | 5 | 7 | 7 | 7 | 7 | 7 | 7* | 6* | 4* | 2 | 126 |
| January week 3: Saturday - Sunday ^{2M} | 4* | 4 | 5 | 7 | 7 | 7 | 7 | 7 | 7* | 6* | 4* | 2 | 126 |
| January week 4: Saturday - Sunday ^{3, 4M} | 4* | 4 | 5 | 7 | 7 | 7 | 7 | 7 | 7* | 6* | 4* | 2 | 126 |
| February week 1: Saturday - Sunday ^{4, 5M} | 4* | 4 | 5 | 7 | 7 | 7 | 7 | 7 | 7* | 6* | 4* | 2 | 126 |
| February week 2: Saturday - Sunday ⁴ | 4* | 4 | 5 | 7 | 7 | 7 | 7 | 7 | 7* | 6* | 4* | 2 | 126 |
| February week 3: Saturday - Sunday | | 4 | 5 | 7 | 7 | 7 | 7 | 7 | 7* | 6* | | 2 | 114 |
| February week 4: Saturday - Sunday | | 4 | 5 | 7 | 7 | 7 | 7 | 7 | 7* | 6* | | 2 | 114 |
| March week 1: Saturday - Sunday | | 3 | 4 | 5 | 5 | 5 | 5 | 5 | 5* | 4* | | 2 | 82 |
| March week 2: Saturday - Sunday | | 3 | 4 | 5 | 5 | 5 | 5 | 5 | 5* | 4* | | 2 | 82 |
| March week 3: Saturday - Sunday | | 3 | 4 | 5 | 5 | 5 | 5 | 5 | 5* | 4* | | 2 | 82 |
| March week 4: Saturday - Sunday ⁵ | | 3 | 4 | 5 | 5 | 5 | 5 | 5 | 5* | 4* | | 2 | 82 |
| April week 1: Saturday - Sunday ^{5, 6M} | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3* | | | 2 | 45 |
| April week 2: Saturday - Sunday ^{5, 6M} | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3* | | | 2 | 45 |
| April week 3: Saturday - Sunday ^{5, 6M} | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3* | | | 2 | 45 |
| April week 4: Saturday - Sunday ^{5, 6, 1M} | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3* | | | 2 | 45 |
| Total | | | | | | | | | | | | 55 | 2,326.5 |

However, it is vital to note that the service requirements do not factor in the additional number of lifeguards required on patrol to create a binding club culture, neither does it accommodate rest or lunch breaks. It simply outlines the baseline minimum operational requirements. This will of course vary from club to club, year to year.

How the data can be applied?

To best apply the recommended surf lifeguard service requirements effort must be made to prioritise the shaded areas, as they represent the greatest requirements for a fully resourced and provisioned lifeguard service. The next step would be to assess the areas around the 'peak' requirements and design a roster that is sustainable to club operations, yet meets the greatest proportion of the 'need'.

| Weekends (Recommended Service 2017/18) | | | | | | | | | | | | | | | | |
|---|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|------|-----------|-------------|--|--|
| Day / Time | 9:00 - 10:00 | 10:00 - 11:00 | 11:00 - 12:00 | 12:00 - 13:00 | 13:00 - 14:00 | 14:00 - 15:00 | 15:00 - 16:00 | 16:00 - 17:00 | 17:00 - 18:00 | 18:00 - 19:00 | 19:00 - 20:00 | Days | Total | | | |
| October week 3: Saturday - Monday ¹ | | | | | | | | | | | | | 0 | 0 | | |
| October week 4: Saturday - Sunday | | | | | | | | | | | | | 0 | 0 | | |
| November week 1: Saturday - Sunday | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 2 | 42 | | |
| November week 2: Saturday - Sunday | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 2 | 42 | | |
| November week 3: Saturday - Sunday | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 2 | 42 | | |
| November week 4: Saturday - Sunday | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 2 | 42 | | |
| December week 1: Saturday - Sunday | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 2 | 42 | | |
| December week 2: Saturday - Sunday | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 2 | 42 | | |
| December week 3: Saturday - Sunday ^{SH} | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 71 | | |
| December week 4: Saturday - Sunday ^{2, SH} | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 71 | | |
| December week 5: Saturday - Sunday ^{2, SH} | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 71 | | |
| January week 1: Saturday - Sunday ^{SH} | 4 | 4 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 2 | 104 | | |
| January week 2: Saturday - Sunday ^{SH} | 4 | 4 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 2 | 104 | | |
| January week 3: Saturday - Sunday ^{SH} | 4 | 4 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 2 | 104 | | |
| January week 4: Saturday - Sunday ^{2, SH} | 4 | 4 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 2 | 104 | | |
| February week 1: Saturday - Sunday ^{4, SH} | 4 | 4 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 2 | 104 | | |
| February week 2: Saturday - Sunday ⁴ | 4 | 4 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 2 | 104 | | |
| February week 3: Saturday - Sunday | 4 | 4 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 2 | 104 | | |
| February week 4: Saturday - Sunday | 4 | 4 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 2 | 104 | | |
| March week 1: Saturday - Sunday | 4 | 4 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 2 | 100 | | |
| March week 2: Saturday - Sunday | 4 | 4 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 2 | 100 | | |
| March week 3: Saturday - Sunday | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 68 | | |
| March week 4: Saturday - Sunday ⁵ | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 2 | 68 | | |
| April week 1: Saturday - Sunday ^{5, SH} | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 42 | | |
| April week 2: Saturday - Sunday ^{5, SH} | | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 42 | | |
| April week 3: Saturday - Sunday ^{5, SH} | | | | | | | | | | | | | 0 | 0 | | |
| April week 4: Saturday - Sunday ^{5, 6, SH} | | | | | | | | | | | | | 0 | 0 | | |
| Total | | | | | | | | | | | | | 46 | 1717 | | |

Fig.1 The red boxed area represents the recommended service by SLSNR based upon the Coastal Research report. The black circle represents the maximum recommended seasonal hours for the provision of a lifeguard service, a proportion of NZLGB funds will be allocated up to this maximum value.



Based upon the model outputs, previous seasonal patrolling hours and staff consultation SLSNR will prepare a recommendation of daily patrolling hours and season length (**Fig.1**) to present to clubs at the pre-season LSO meeting.

Lifesaving Services Agreement (LSA)

The LSA is an agreement between club and region that states the minimum season length and daily hours for the patrolling season. It also covers how patrols shall be delivered to at least the minimum standards stipulated in the Patrol Operations Manual

Regional process and formation of LSA

This process and the SLSNR recommendations will be discussed formally at the pre-season Lifesaving Officer (LSO) meetings. It is then the responsibility of the LSO to consult the club committee and formalise the daily patrolling hours and season length in preparation for the submission of the Lifesaving Services Agreement (LSA) in early October. The steps below summarise the process:

- 1. Preseason LSO meeting:** Can current patrols meet the SLSNR recommendations (**Fig.1**), based upon returning members and projected SLGA candidates
- 2. Consultation process** with club committee regarding the SLSNR recommendations. Local knowledge and validity of model are means to be considered. [Nick Mulcahy](#) is happy to discuss with clubs their individual coastal reports and recommendations in depth if required
- 3. Submission of LSA** to SLSNR

Note: Clubs will be allocated funding based upon the total amount of lifeguard hours they patrol per season – this will be reflected in the clubs **LSA**. This will form a proportion of the NZLGB funding and allocated up to the maximum recommended hours (**Fig.1**) as displayed in the spreadsheet within section 7.1 of the Supervision and Surveillance Assessment Report for each patrol location (SLSNR approved Base and Satellite patrol locations)

Meeting the need: Regional assistance

- 1. Rostering and organisational** assistance through Volunteer Supervisor: populate standardised roster template based on recommendations. This will be planned for the annual pre-season meeting in September. Additional points to consider:
 - Start times be staggered to account for increased hours and to reduce total hours worked by members.
 - Dual patrols – **Patrol A** (10:00-15:00) / **Patrol B** (13:00-18:00)
 - Using a smaller team of engaged and stimulated lifeguards on patrol will not only benefit operations but has potential to empower and focus continuous development of individuals (Patrol A)
 - The second half of the patrol (Patrol B) can effectively structure their downtime with core focus on team building, upskilling and training.



2. **Training needs analysis** will identify and help support clubs to meet a) POM (primarily) b) The evidence based service requirements. This will be achieved through an assessment by the Training Supervisor and Volunteer Services Supervisor in the lead up to the season. Courses can then be tailored to specific districts within the region where there has been an identified shortage of qualifications.

3. **Surplus to the recommendations.** There will be an option to formally support other SLSNR clubs with a supplementary patrol. This would provide suitably qualified lifeguards to ensure struggling clubs can meet their POM.
 - This can be formally arranged pre-season