3.0 REMOTE SENSING AND PRE/POST IMAGERY

Imagery from remote sensing activities has become a readily available and critical resource in all phases of post-disaster response including initial reconnaissance planning, in-field logistics and information logging. The response to the February 27, 2010 Chile earthquake was no exception with a USGS coordinated collaboration whereby individuals and organizations responding to the event could participate in regularly scheduled teleconferences and receive updates of both available imagery from NASA and other organizations as well as information on the status of acquiring data over priority areas of interest in the earthquake zone. An example of the typical output shared amongst this group is shown in Figure 3.1. GEER team members further analyzed this data to produce summaries of pre and post imagery by imagery type as shown in Figure 3.2 to 3.15.

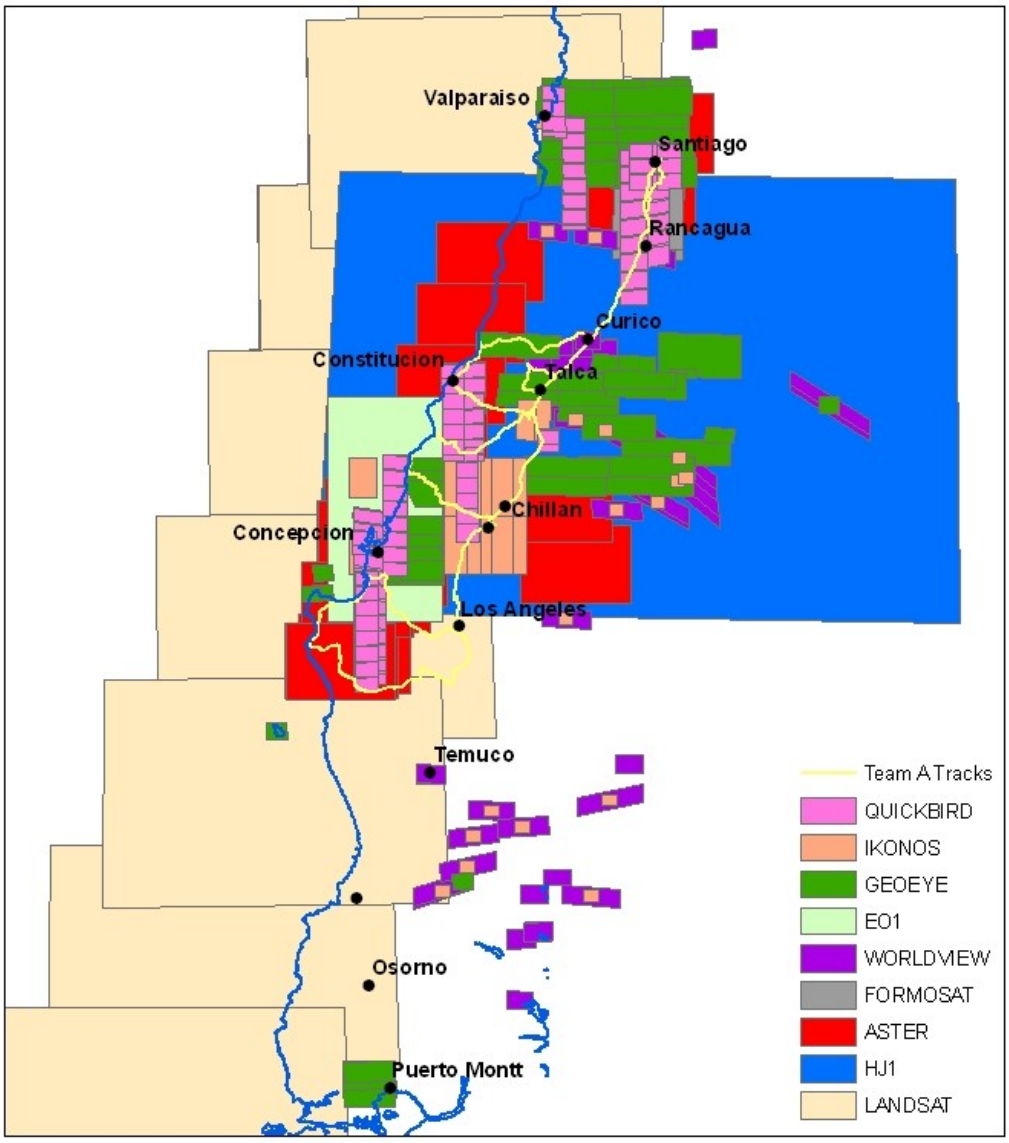

Figure 3.1. Satellite Coverage (source USGS EROS Center)

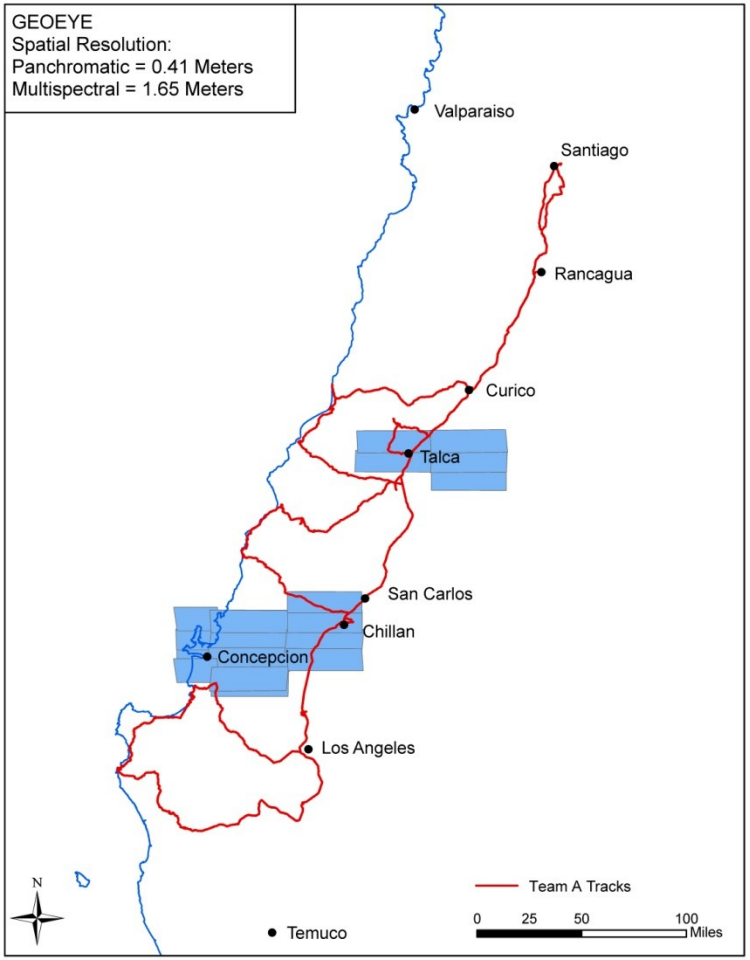

Figure 3.2. GEOEYE pre coverage

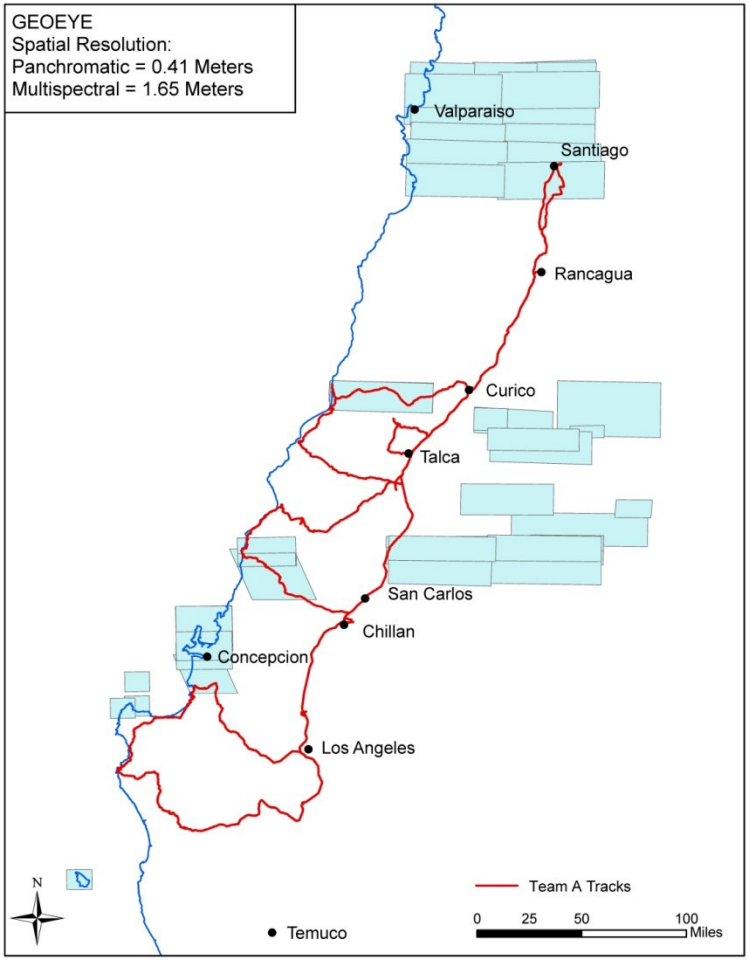

Figure 3.3. GEOEYE post coverage

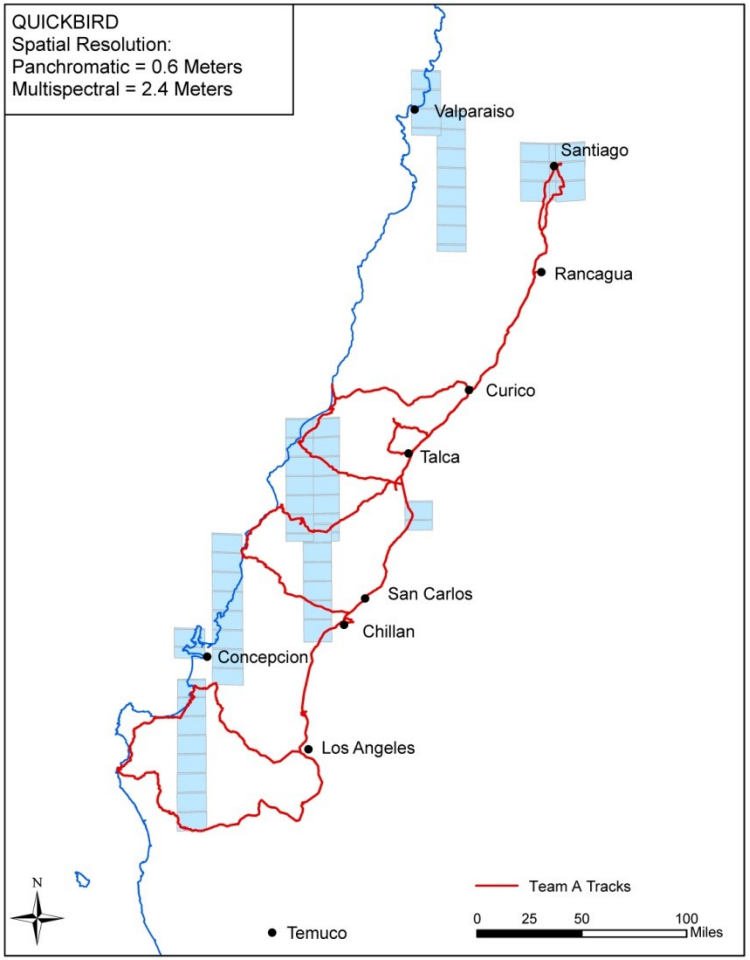

Figure 3.4. QUICKBIRD pre coverage

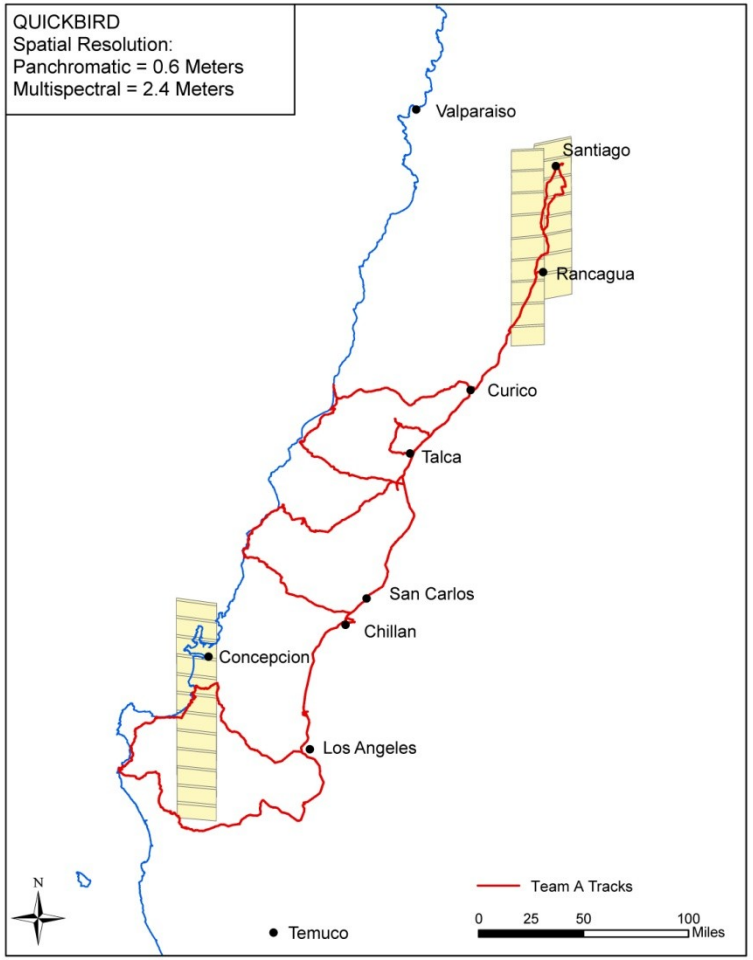

Figure 3.5. QUICBIRD post coverage

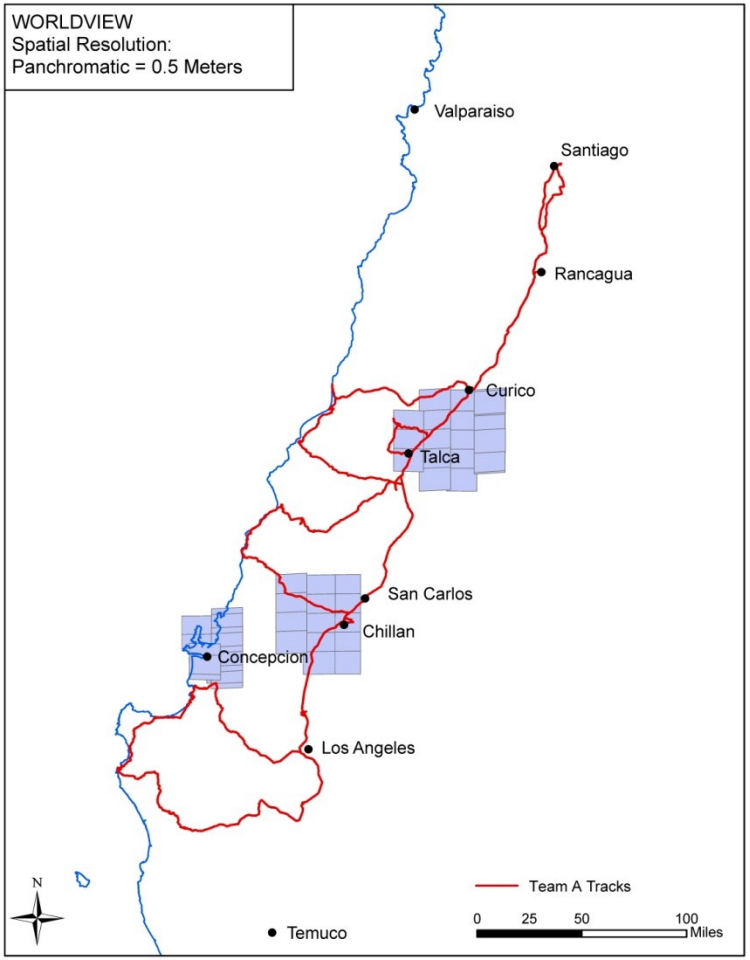

Figure 3.6. WORLDVIEW pre coverage

Figure 3.7. WORLDVIEW post coverage

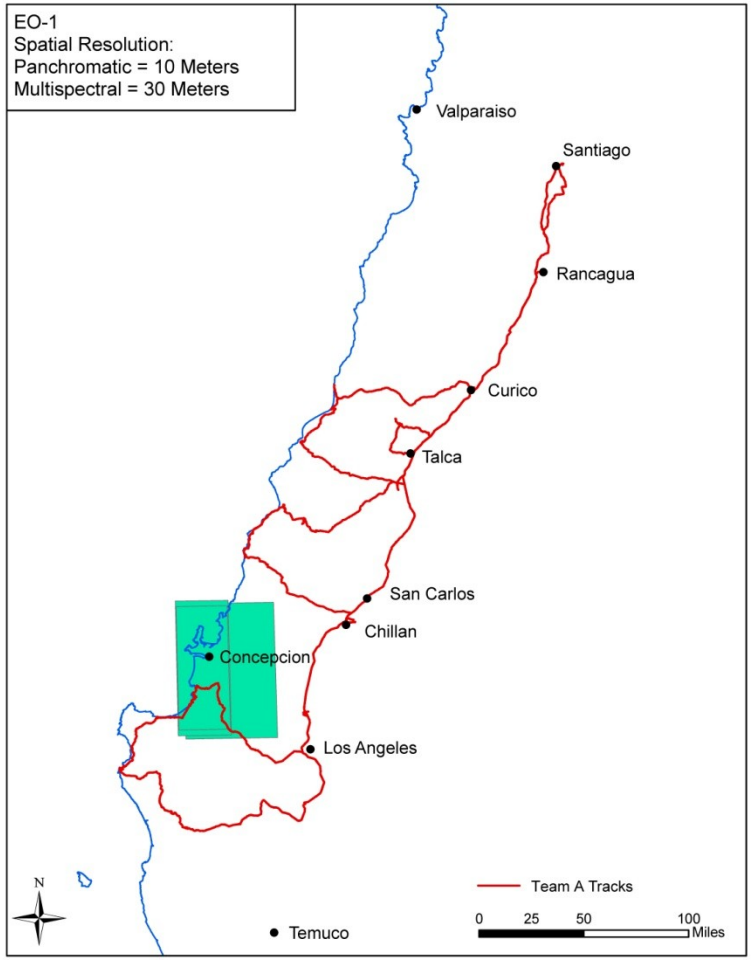

Figure 3.8. EO-1 pre coverage

Figure 3.9. EO-1 post coverage

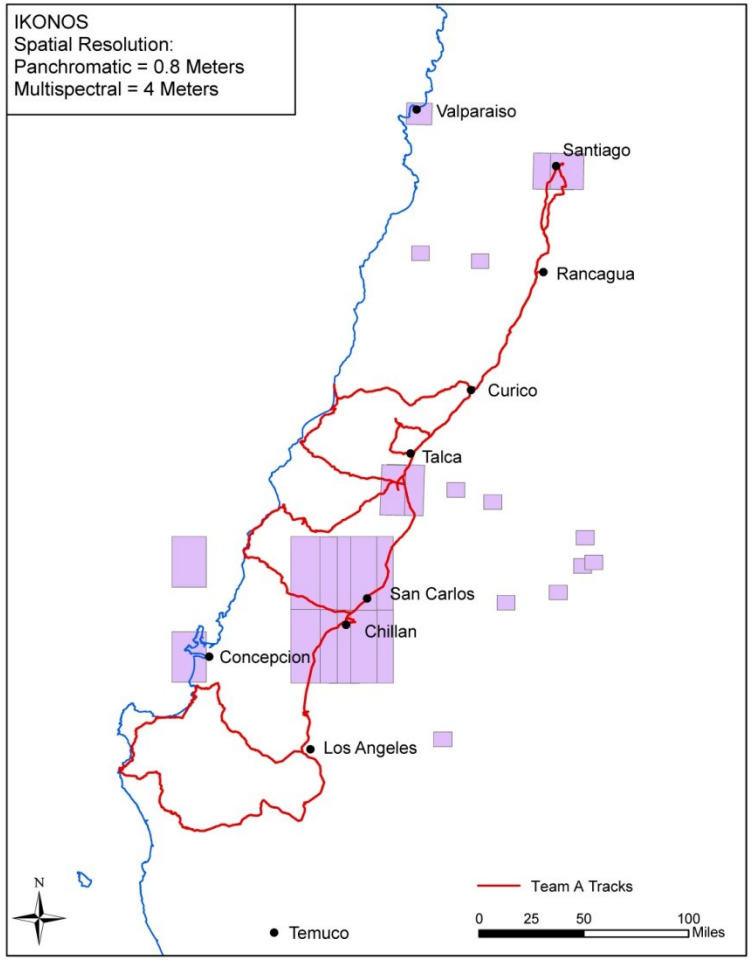

Figure 3.10. IKONOS post coverage

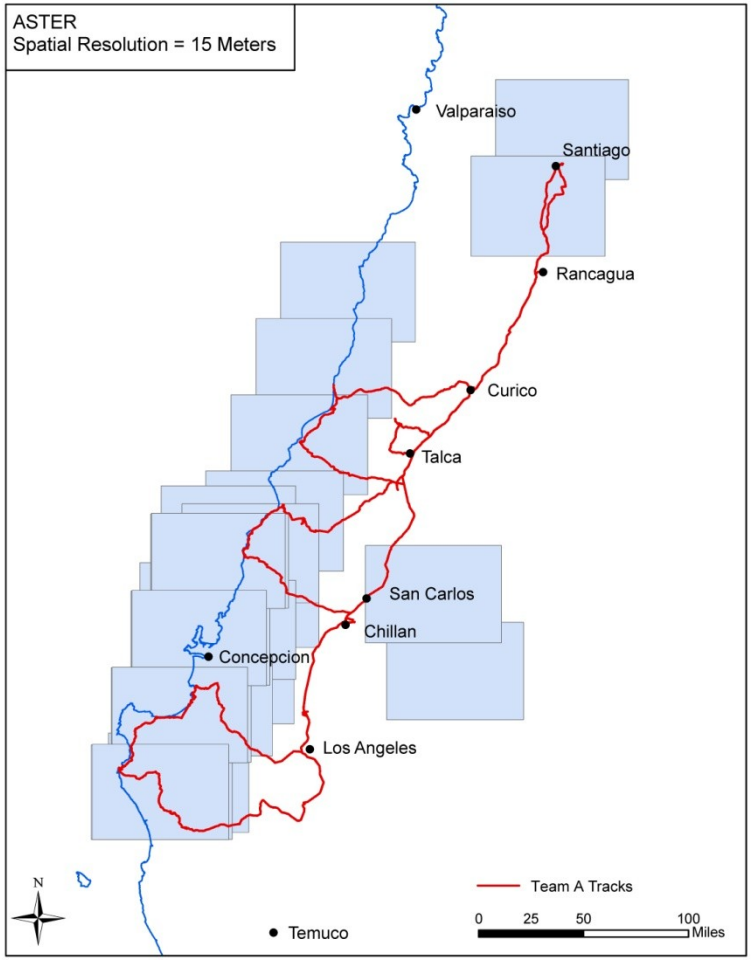

Figure 3.11. ASTER post coverage

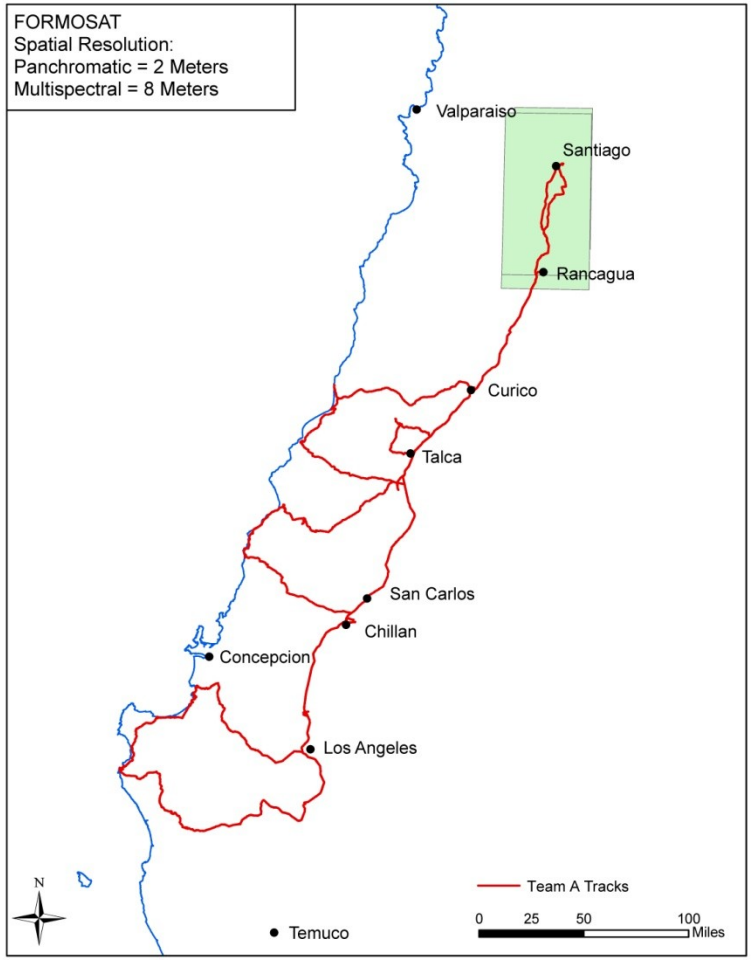

Figure 3.12. FORMOSAT post coverage

Figure 3.13. HJ-1 post coverage

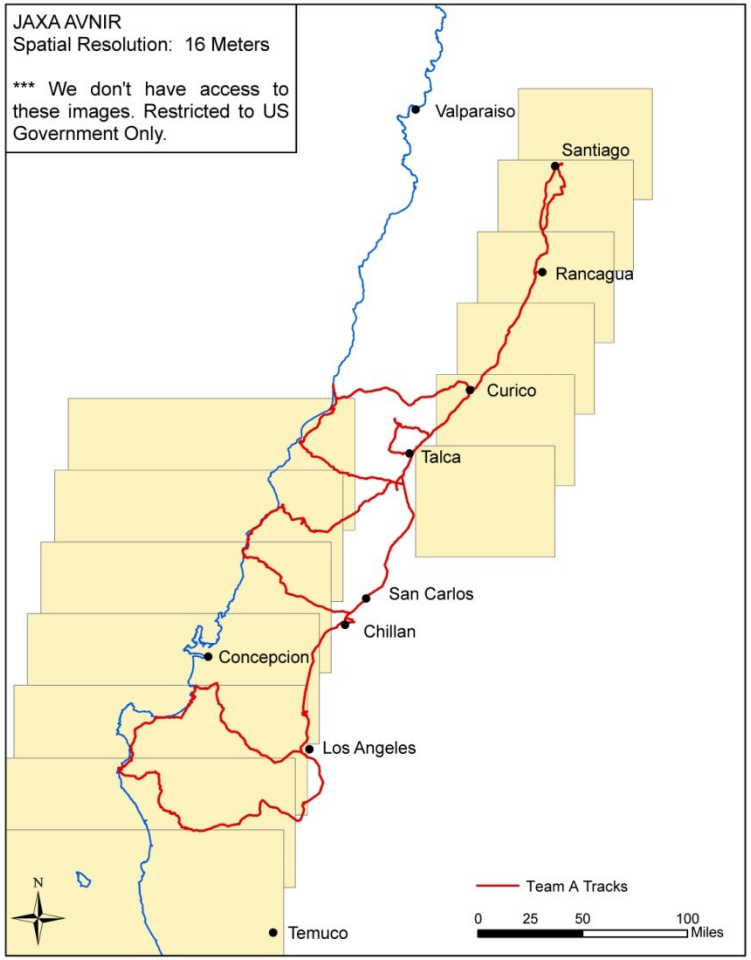

Figure 3.14. JAXA AVNIR post coverage

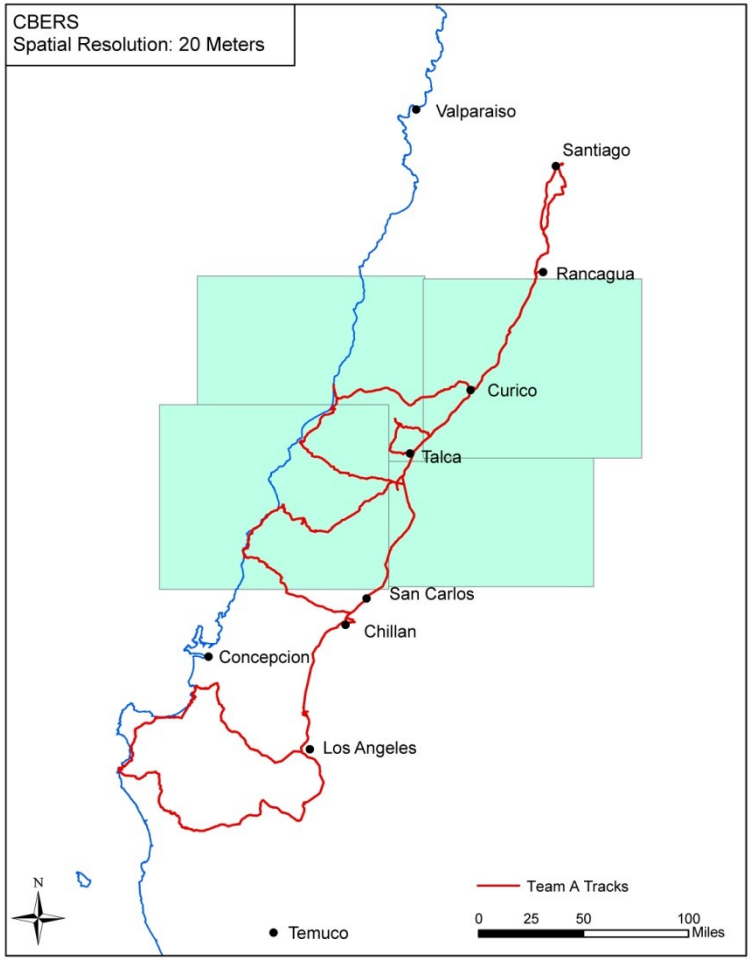

Figure 3.15. CBERS post coverage

Figures 3.2 to 3.15 show the tracks of the areas in which much of the ground reconnaissance of Team A was conducted. This effectively reflects the entire area over which strong ground motion effects produced geotechnical distress and/or failures. The activities of Teams B, C and D were generally contained within this same area. For detailed geotechnical reconnaissance activities, it is critical to have high resolution pre and post event image pairs. In general, the areas where high resolution imagery is available do not include many of the areas where significant geotechnical impacts were observed.

Apart from the image data of the type referenced in Figures 3.1 through 3.15, the emergence of Google Earth and indeed the full suite of Google geospatial data and tools has become a central element of many reconnaissance activities including those of GEER. The ability to view pre and post images of areas of possible interest, even at moderate resolution, can greatly enhance decisions on where to send ground teams as well as serve as a valuable base layer for subsequent spatial data information as shown in Figures 3.16 and 3.17 below. Figures 3.18 to 3.29 shows selected image pairs of pre/post earthquake used by the GEER team in supporting ground reconnaissance efforts. Other examples of the usage of Google Earth images as base layers for GEER team member activities are presented throughout the report.

Figure 3.16. Google Earth based image of Team A reconnaissance tracks.

Figure 3.17. Google Earth based pre-event image of Las Palmas Tailings Dam that failed.

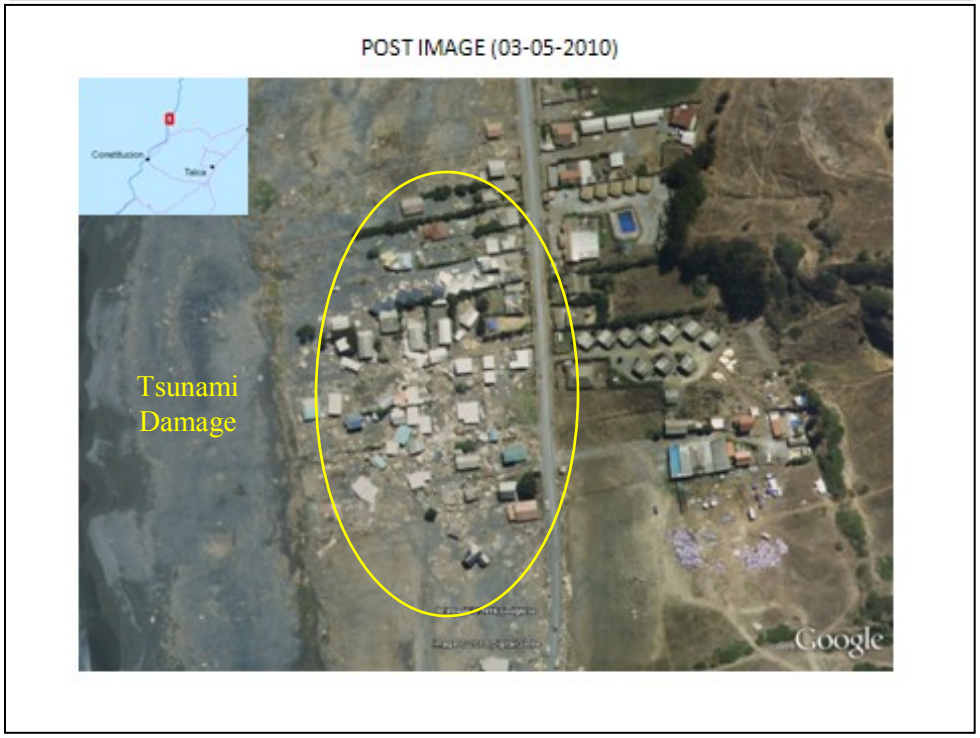

Figure 3.18. Pre/Post Imagery of Iloca (34.924° S, 72.179° W)

Figure 3.19. Pre/Post Imagery of Iloca (34.936° S, 72.181° W)

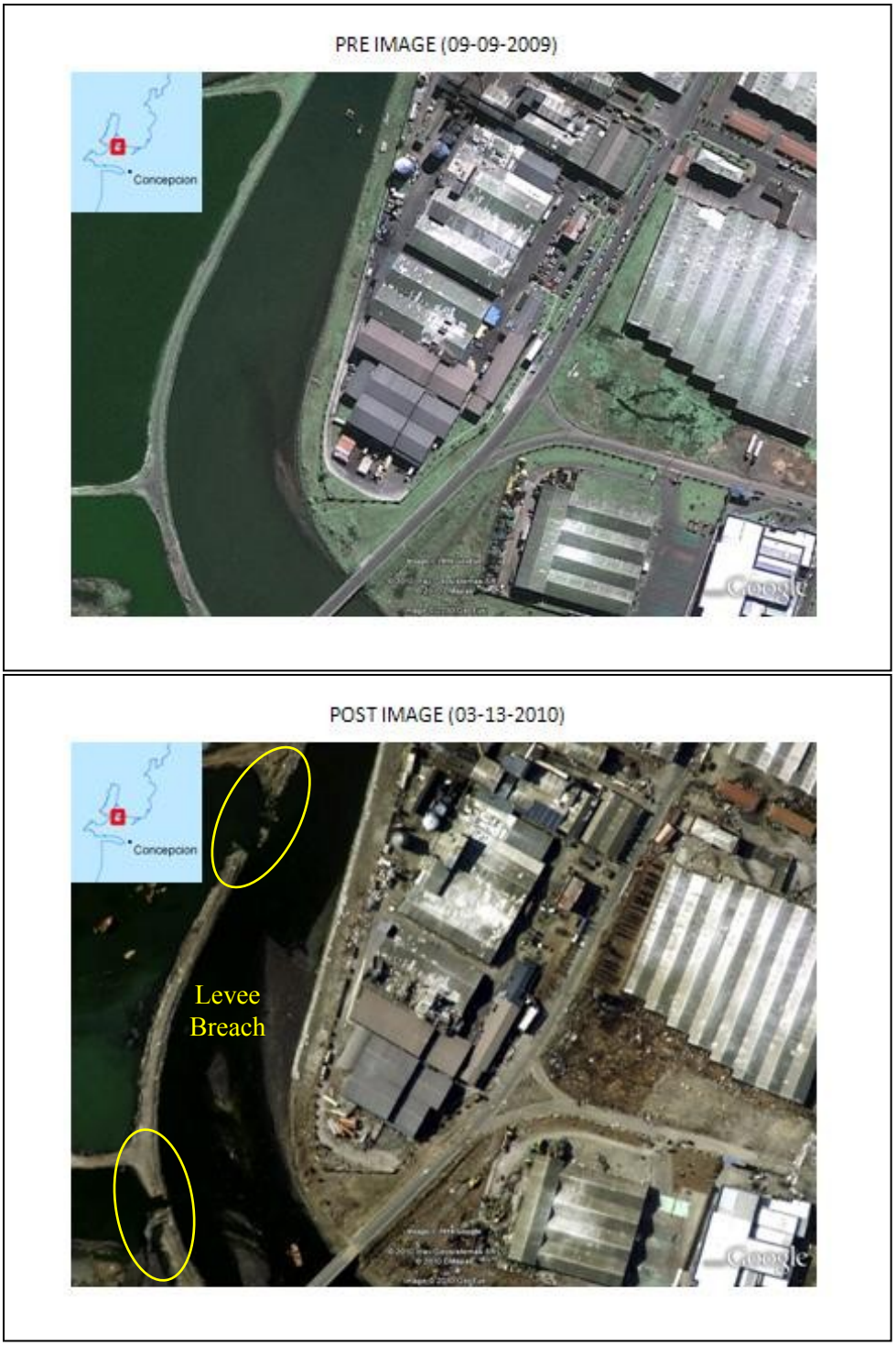

Figure 3.20. Pre/Post Imagery of Talcahuano (36.729° S, 73.104° W)

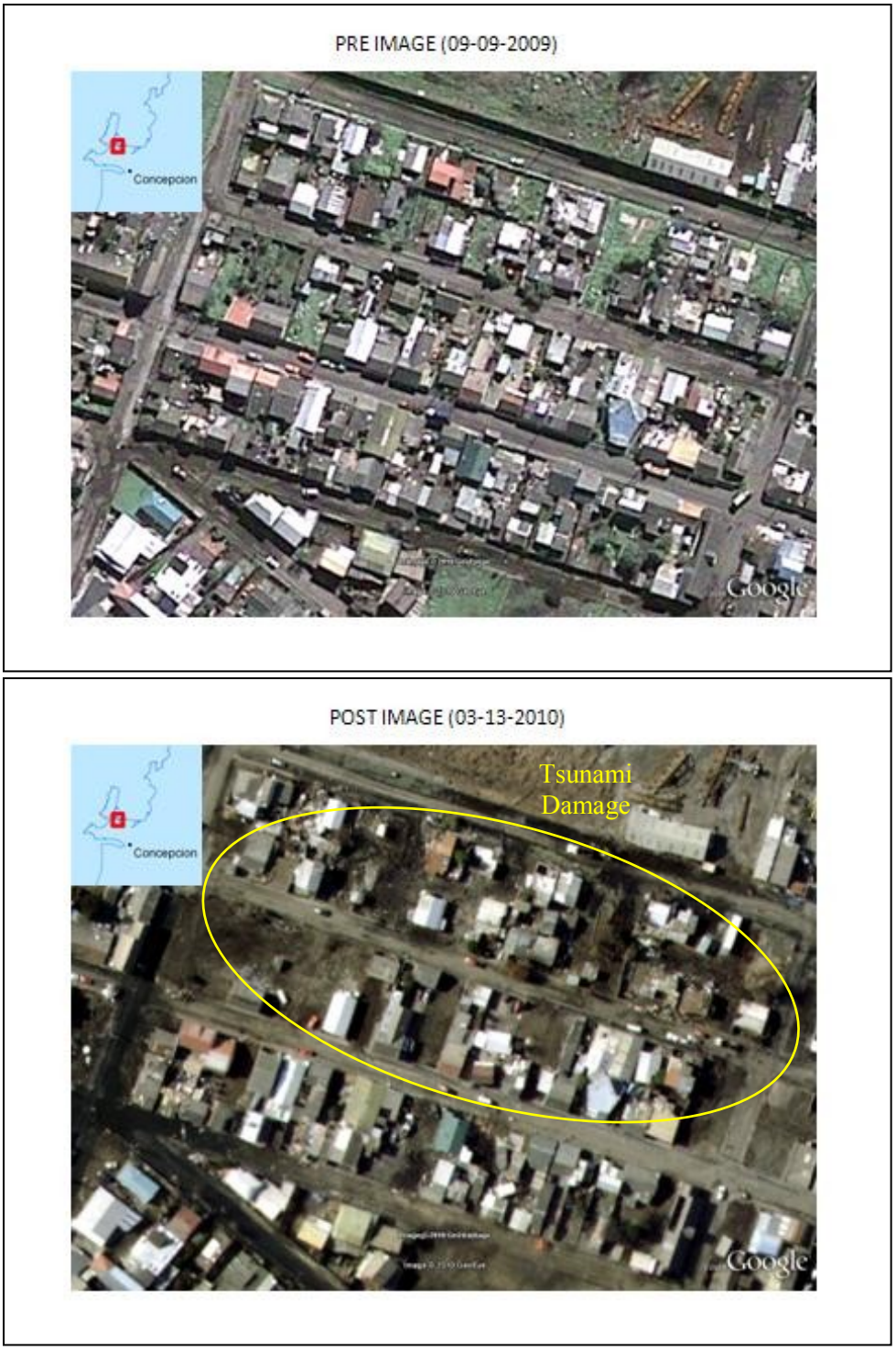

Figure 3.21. Pre/Post Imagery of Talcahuano (36.738° S, 73.097° W)

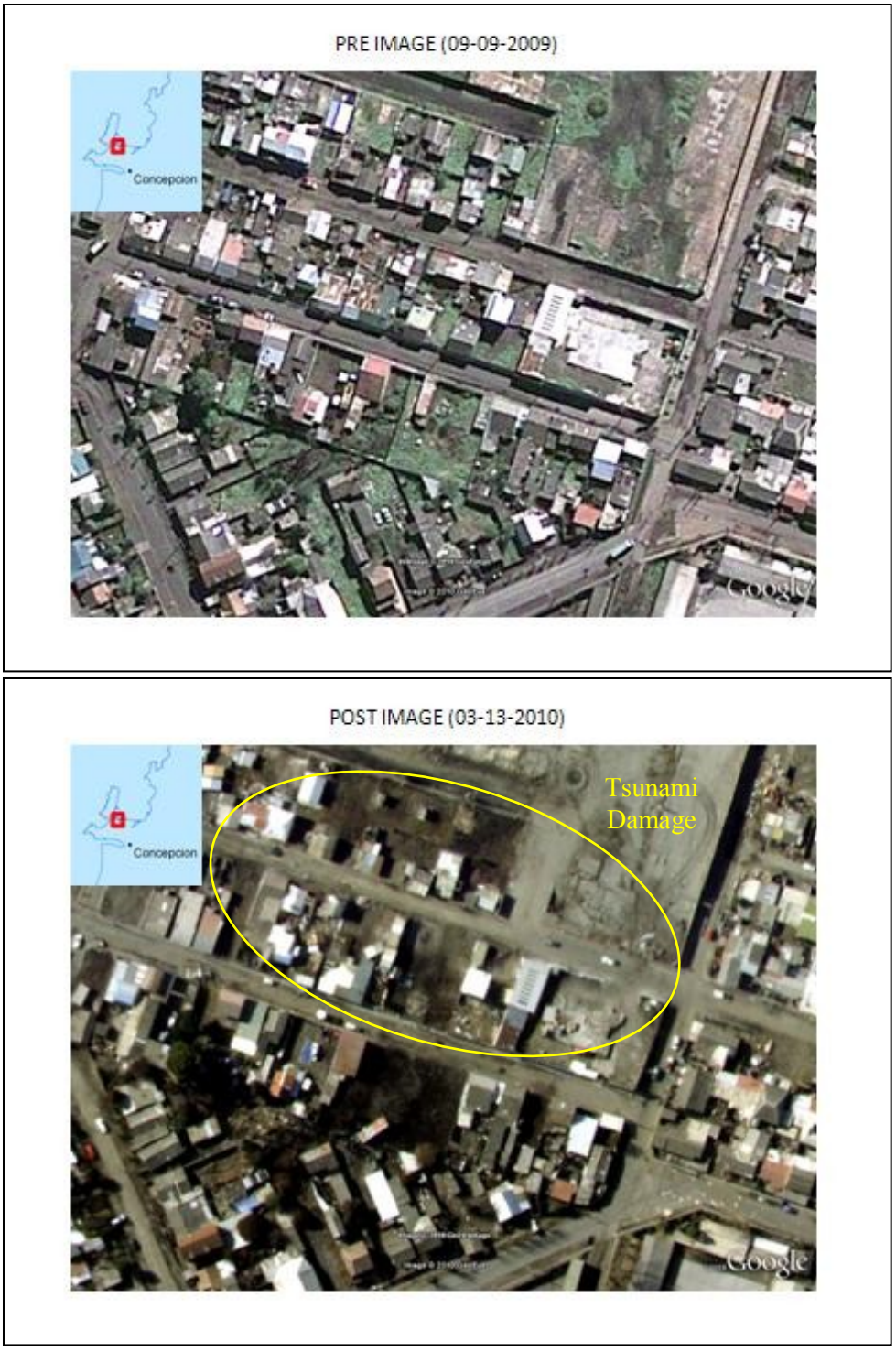

Figure 3.22. Pre/Post Imagery of Talcahuano (36.739° S, 73.094° W)

Figure 3.23. Pre/Post Imagery of Talcahuano (36.734° S, 73.079° W)

Figure 3.24. Pre/Post Imagery of Talcahuano (36.731° S, 73.097° W)

Figure 3.25. Pre/Post Imagery of Concepcion (36.815° S, 73.066° W)

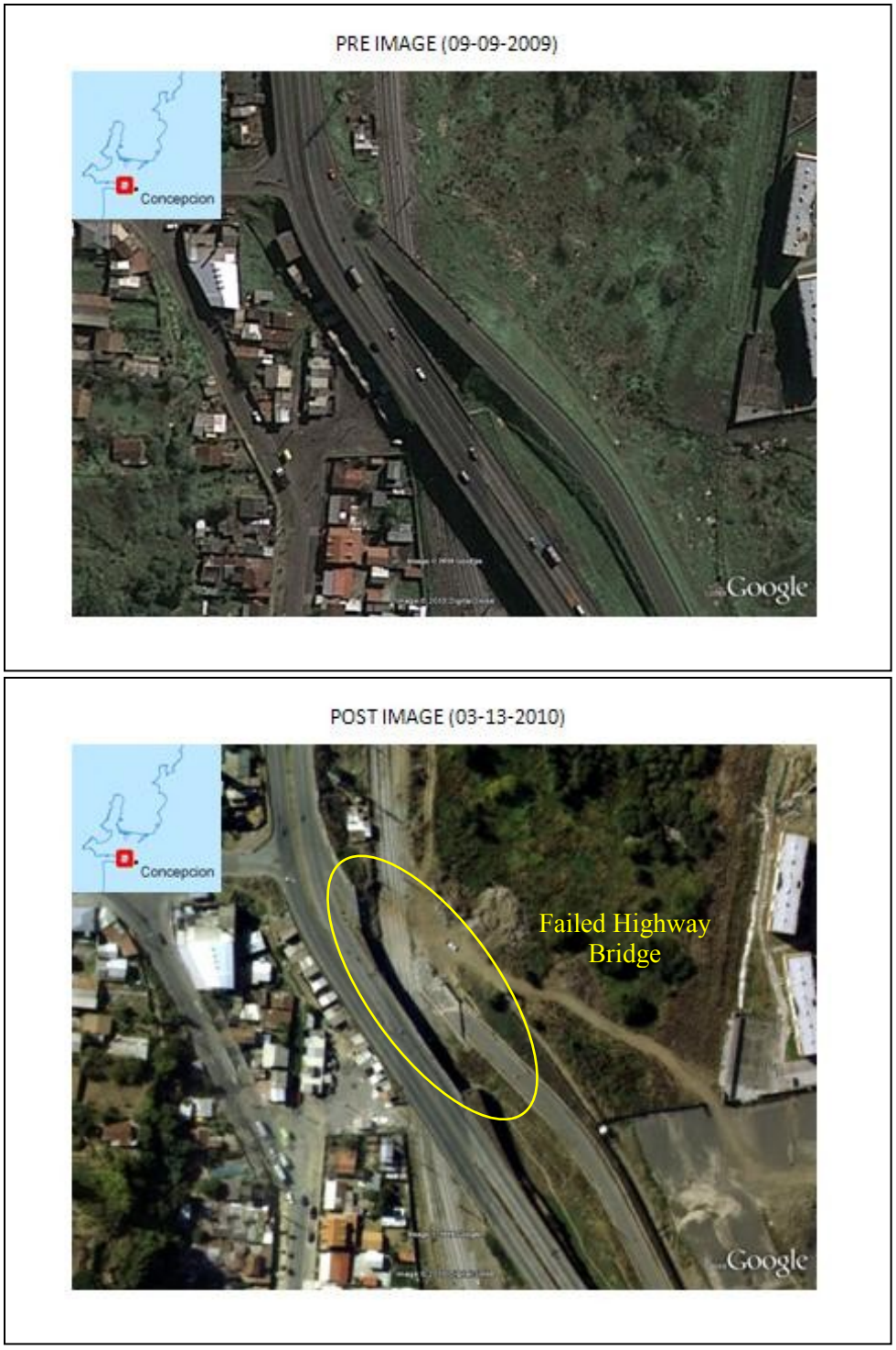

Figure 3.26. Pre/Post Imagery of Concepcion (36.819° S, 73.066° W)

Figure 3.27. Pre/Post Imagery of Concepcion (36.828° S, 73.062° W)

Figure 3.28. Pre/Post Imagery of Constitucion (35.326° S, 72.409° W)

Figure 3.29. Pre/Post Imagery of Constitucion (35.337° S, 72.403° W)